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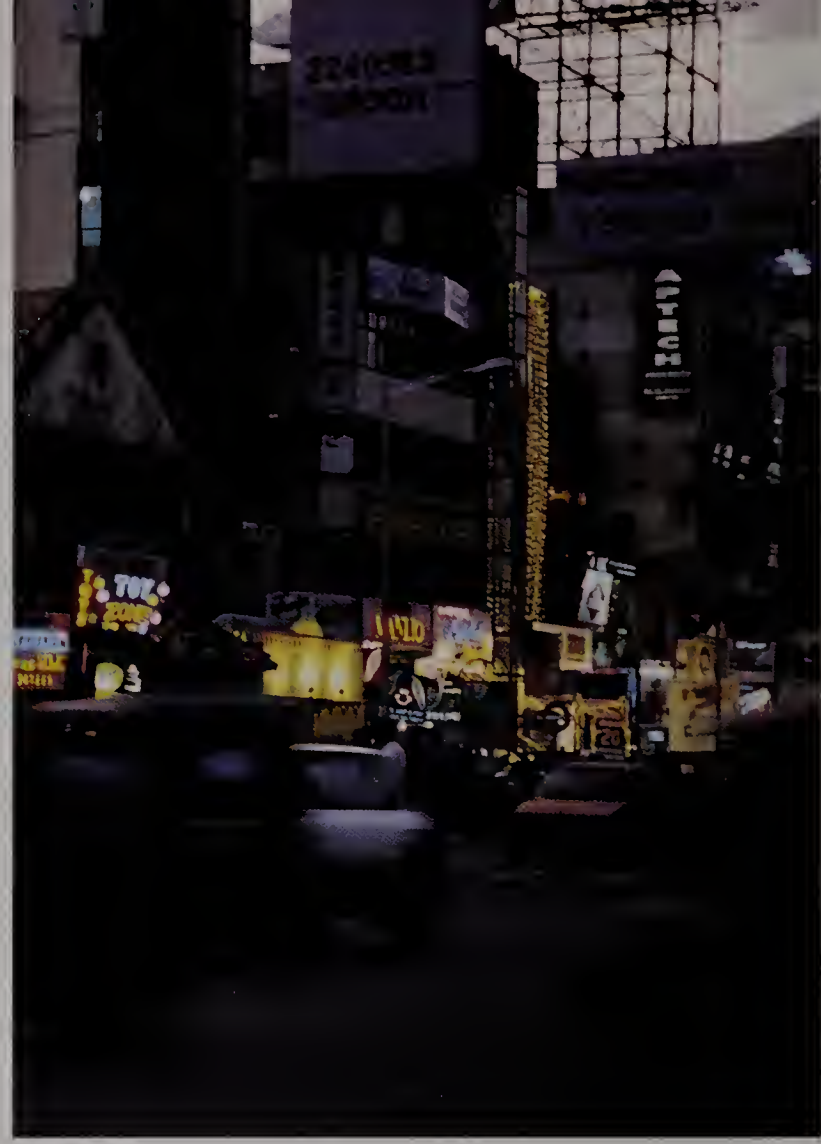

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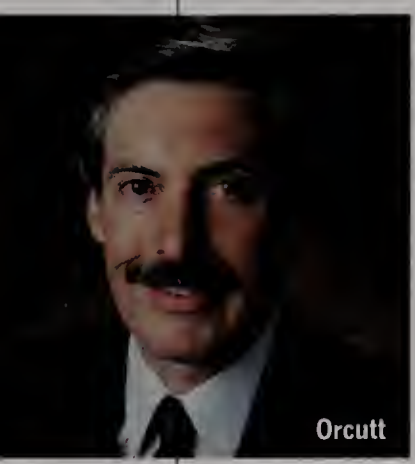
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SOUND OFF During the next decade, some experts predict, the role of the CIO will split in two: The CTO will take over technical operations and a new crop of technoliterate CEOs will make strategic technical decisions all on their own. What's left for the CIO? Read Martha Heller's column and sound off.
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*Source: IDC, December 1999. *Who Will be Leading the Global IT Services Industry in 2000?*: A Competitive Analysis by Mauro Peres, Sophie Janne Mayo.

From the Editor

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A New Role for Global Business

In the past decade, there's been a marked shift in attitudes toward capitalism and consumerism around the world. Countries on every continent are moving to a more pro-market/consumer-based philosophy of economic development. As growth slows in the United States, large corporations and startups alike are turning to the developing world for new opportunities and getting a relatively warm reception. And, of course, the Internet is only accelerating global business trends.

While things are moving fast, we're still in the early days of achieving a truly global economy. According to Jeffrey E. Garten, who is dean and William S. Beinecke professor in the practice of international trade and finance at the Yale School of Management, if things continue on the current track, the percentage of goods flowing through global markets will increase from 20 percent today to 80 percent in five years.

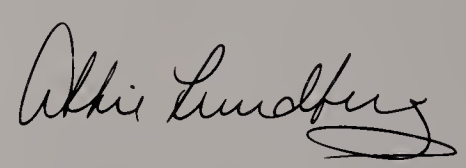
But getting there isn't going to be easy. Globalism involves not only business and economics, but also politics, culture and many social issues. Barriers to doing business in developing nations aren't limited to the lack of a sound physical infrastructure, such as modern telecommunications and a consistent power supply. More fundamental support structures must be in place as well: clean water, ample food supplies, adequate education, environmental controls and basic health care. Business leaders can't assume these challenges will be taken care of by local governments—in too many cases, they simply don't have the resources.

"The leaders of big global companies grossly underestimate what they're going to have to do to build infrastructures," Garten said at the CIO Perspectives conference in Phoenix last October. "The corporate sector has to play a greater role in building the social fabric" of the countries they go into.

Such an approach could help temper the growing backlash against globalism among nationalist groups (witness the protests against the World Trade Organization in Seattle last year). Of course, mishandled, such efforts will undoubtedly be viewed as imperialistic and inappropriate meddling. There's a real danger in getting too far ahead of what local people are ready for, Garten warns businesses. "If we go too fast, disorientation occurs."

This summer, *CIO* Senior Editors Tom Field and Cheryl Bentsen went to India to explore these and other issues in a country that is emerging as a high-tech mecca and one of the world's promising—though extremely challenged—new economies. As Tom writes in "India Unbound" (Page 88), "How far and fast can the IT industry grow in a country where the lights and phone lines fail daily? How many knowledge workers can be created from a population with a more than 50 percent illiteracy rate? What social ramifications might there be if India's new IT wealth proves only to widen the gap between the country's haves and have-nots? These are among the vexing challenges that come hand in hand with India's bountiful opportunities."

In a world driven by global business, business leaders will have to assume a much broader and more diverse role. Is your organization prepared to take on these challenges? I'd love to hear about it.



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Reader Feedback

COMPUTERS IN THE CLASSROOM

It's about time that someone took a hard, dispassionate look at the role of computers (and technology) in the classroom. Why there is a push at all toward using computers as teaching aids is somewhat baffling. To my knowledge, there is zero evidence that any benefits result from using them this way. And as Clifford Stoll points out in his Difference Engine column ["Pull the Plug!" Sept. 1, 2000] there are numerous disadvantages. We're talking about our children's education here, one of the most important (yet strangely least valued, in the United States, anyway) investments a society can make.

What needs to be done is to separate computers as teaching tools from computers as an end in themselves. For instance, while computers contribute little to nothing as teaching aids, schools would be justified in offering elective, vocational courses that teach computer skills such as programming or network design. It's a fact that computers are an ever-growing force in our world. Ignoring them in the schools is just as stupid as worshiping them. So while teaching high-paying vocational computer skills is a responsible thing to do, using computers to teach, let's say, literature or geography is probably detrimental (or at least not proven beneficial).

My own experiences show that the more someone knows about computers, the less apt he is to desire them to be the center of the classroom experience.

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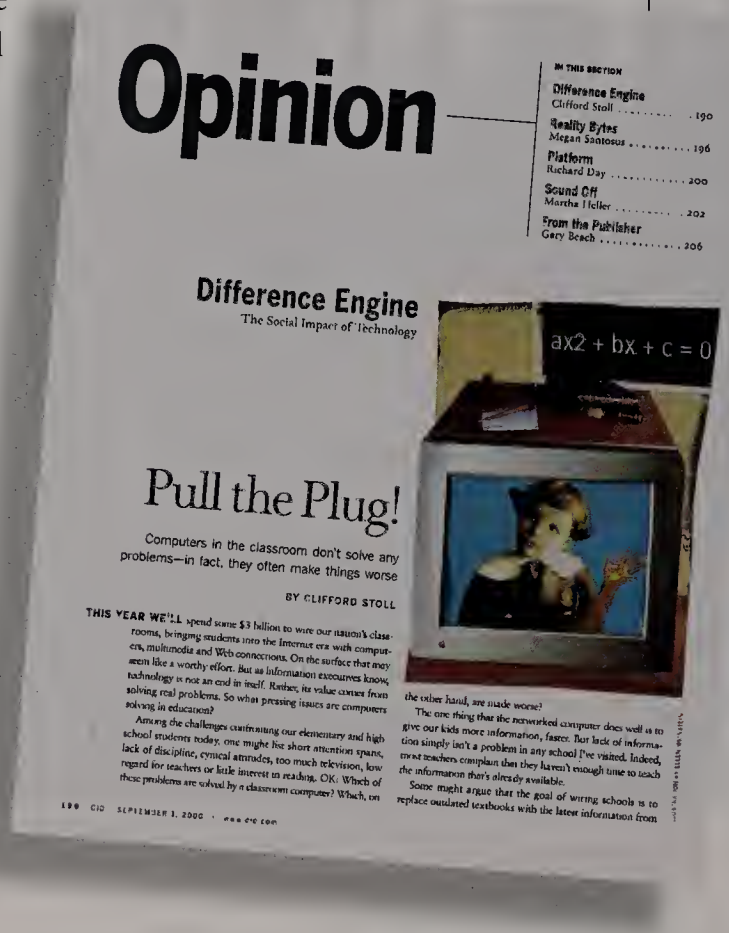

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Difference Engine
The Social Impact of Technology

Pull the Plug!

Computers in the classroom don't solve any problems—in fact, they often make things worse

BY CLIFFORD STOLL

THIS YEAR WE'LL spend some $3 billion to wire our nation's classrooms, bringing students into the Internet era with computers, multimedia and Web connections. On the surface that may seem like a worthy effort. But as information executives know, technology is not an end in itself. Rather, its value comes from solving real problems. So what pressing issues are computers solving in education?

Among the challenges confronting our elementary and high school students today, one might list short attention spans, lack of discipline, cynical attitudes, too much television, low regard for teachers or little interest in reading. OK: Which of these problems are solved by a classroom computer? Which, on the other hand, are made worse?

The one thing that the networked computer does well is to give our kids more information, faster. But lack of information simply isn't a problem in any school I've visited. Indeed, most teachers complain that they haven't enough time to teach the information that's already available.

Some might argue that the goal of wiring schools is to replace outdated textbooks with the latest information from

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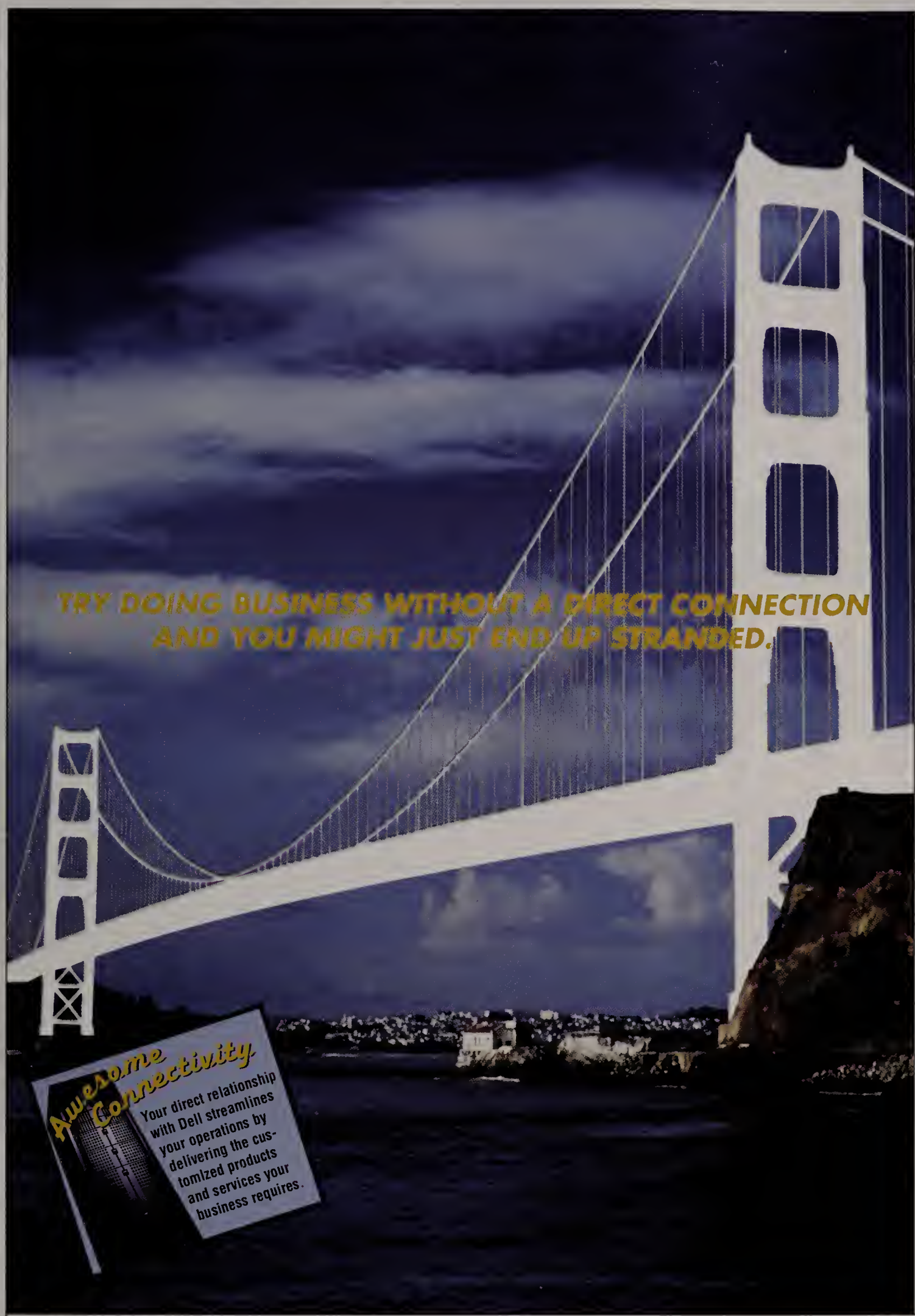
During my two years as a middle school principal, I watched thousands of dollars worth of computers gather dust as they quickly achieved obsolescence. Students destroyed the operating system and put gum in the floppy drives. Most teachers needed in-service training just to learn how to correctly turn the computer on and off. When we tried to install a computer lab in our 1952-vintage building, we had to completely rewire the room because the electrical system wouldn't support the computers. That cost wasn't considered in the acquisition and purchase estimates.

I was recently appointed director of information technology in the same school district, and we have learned a lot about planning for technology in classrooms. The federal government has provided money, we spent it, and we now have enough foresight (and failed projects) to plan for the costs to upgrade the infrastructure. We have spent hundreds of thousands of dollars on this educational venture, and our network is nearly state-of-the-art (as of the day we began planning for its installation). I, of course, am committing heresy when I say that I think we are wasting hundreds of thousands of dollars. Stoll is correct in his assessment.

However, the technology could be used in education to improve administrative decision making, to assist teachers in recordkeeping, to shuffle the huge amounts of data that we must house, and to track student achievement and teacher productivity. Problems exist that could be solved using computer technology. Unfortunately, we are purchasing the solutions without having a genuine problem to solve.

In an ethically subversive way, I see my role as damming the flood. Somehow I have to balance the frenzy to wire every student with the reality that Stoll describes. We can't ignore the thousands of dollars designated for educational technology. School boards, parents and superintendents would have a fit if we said that we don't need that money for computers but could use it instead for buildings and teacher training. But if we have to use it for computer tech-



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nology and infrastructure, I want to use it wisely. We just have to put the fruits of that money to real use so that it isn't gathering dust as it achieves obsolescence. But how?

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Ignoring computers in the schools is just as stupid as worshiping them.

There's nothing really new here, sorry. While I'm sympathetic with Clifford Stoll's point of view, I need insight into the alternatives. Classroom computing is not going away, and there are too few models of how to use it well. While there is quite a bit of research in the field, there seem to be few articles outlining how people best learn in a computing environment. I hate to be catty, but this sounds like an article on best practices—something *CIO* should know well.

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Stoll's column identifies all the ways computers are being used either incorrectly or ineffectively, and his conclusion is to get rid of them. That makes no sense! Computers are great for certain things in the school environment such as for lessons that involve a lot of repetition.

All of us have heard horror stories of classes aimed at the median level of students, where the advanced students are bored silly and the slower students still can't keep up. Properly designed computer-based teaching can accommodate varying levels of capability and permit students at each level to move at their own pace. The point here is that you cannot continue to teach the same old way and just arbitrarily substitute a computer for a teacher.

The change engendered by the computer is more than evolutionary, it's revolutionary. If processes aren't changed accordingly, computers are a big waste of money. This has been proved repeatedly in business environments. Instead of criticizing schools for making the same mistakes, we should be showing our schools how to apply the knowledge gathered in other industries so that they can make the most of computers as a powerful tool.

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THE DECLINE AND FALL OF THE E-AGE?

I think the Sept. 1, 2000, Total Leadership column ["Lose the 'E'"] is right on target. Leadership is and always has been leadership, even without the "e" prefix.

Christopher Hoenig rightly points out that leadership styles must change as times change, especially when significant factors form the underpinnings of an enterprise change. Today, electronics and the knowledge to exploit the "e" have become a significant factor. Who knows what tomorrow will bring?

At the same time, I would submit that significant factors tend to dominate for increasingly smaller intervals of time, as evidenced by the progress from farming to the industrial revolution to today's Internet age. The window of dominance (so to speak) for a significant factor has now shrunk to a decade or so. In that decade, however, the factor seemed to be permanent, and hence the bandwagon to adopt and propagate it (often in distorted extravagance).

We are now in the middle of the e-age. This is about the time that early innovators of alternatives start emerging. As the e-age declines these people will come to the forefront. And they will then confirm that there was no such thing as e-leadership—except for during the window of time when e-speak and e-think ruled.

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CIOS IN THE MIDDLE

"Standing in the Middle" [Sept. 15, 2000] was a great article. Perhaps the biggest problem in the midmarket is the reseller channel. Few of the value-added resellers that are focused on packaged product sales have the business acumen, financial resources, technical personnel or project management skills to adequately manage multiple, simultaneous implementations of the software. They are very good at selling software but not good at installing and using it as an agent of organizational change. The end result is that business process redesign or validation rarely, if ever, get discussed. (Best practices? We don't need no stinkin' best practices.) Rather than using ERP implementation as a method to move toward process simplification and

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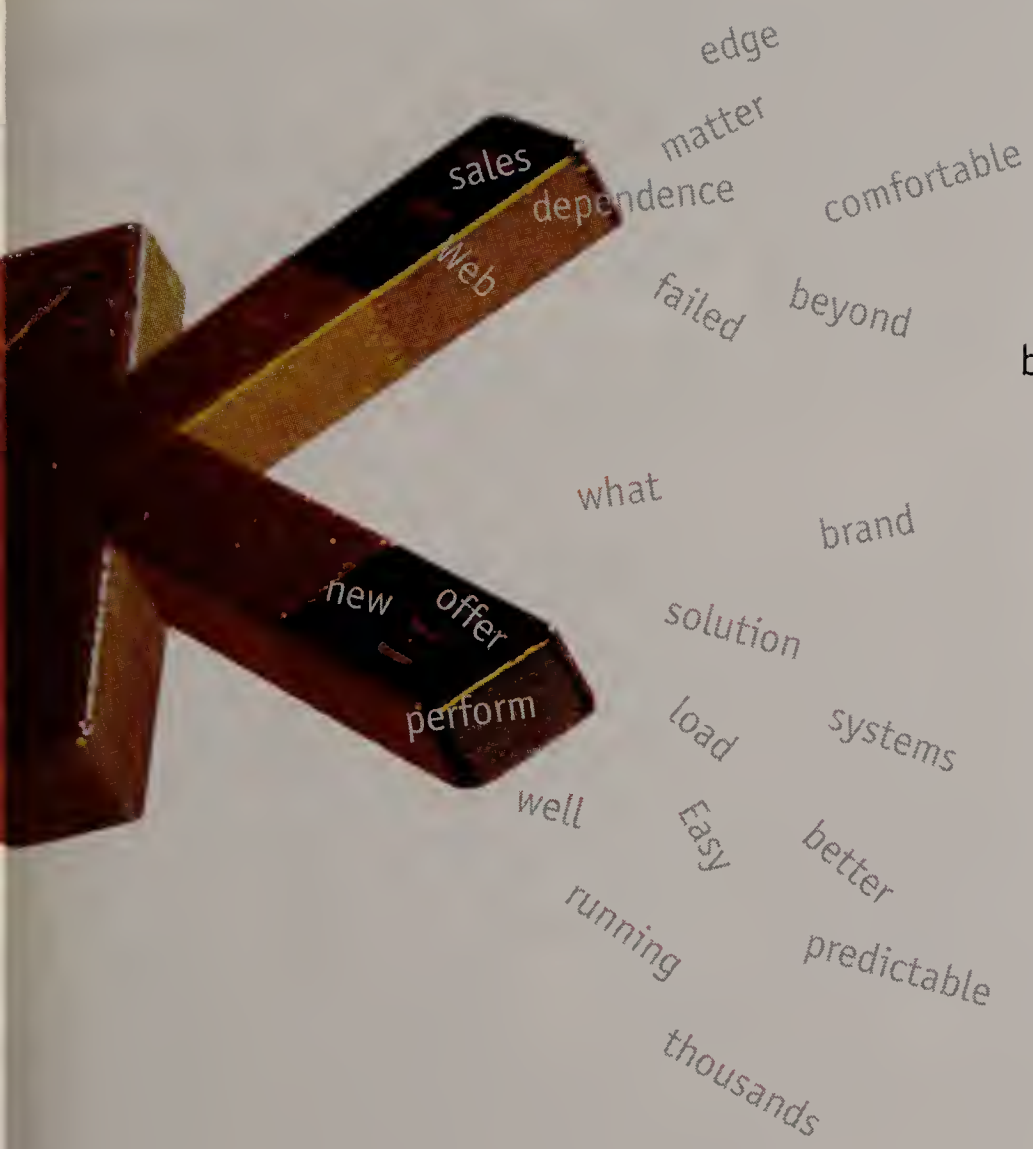

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improvement, many small companies end up with automated, fast, bad processes left over from legacy systems.

Jonathan Lidz
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"Standing in the Middle" is right on the money. Midmarket IT shops face tremendous challenges that are so rarely understood by today's software providers and, especially, consultants. I agree that more midsize companies are seeing the strategic benefits of IT in their businesses, but it hasn't been an easy sell.

Obviously there are exceptions, but the internal sales job and convincing that goes on in these smaller companies, many of which are family-owned, goes far beyond a solid ROI justification. There are emotions tied into the process like trust and gut feeling. This multifaceted strategic-planning role combined with being chief cook and bottle washer makes the job of CIOs at midsize companies much tougher, in my opinion, then that of their counterparts at larger companies.

Thanks for paying attention to us in the middle. There are only 500 CIOs at Fortune 500s, but a heck of a lot more of us out here.

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Value-added resellers are very good at selling software but not good at installing and using it as an agent of organizational change.

LUCY.COM REBUTS PRIVACY STORY STATEMENT

I would like to set the record straight about the report from Interhack Corp. concerning Lucy.com that was referenced in your "So, What's All the Fuss About?" [Oct. 1, 2000] feature. That report claimed, and a paragraph insinuates, that Lucy.com misuses data about our customers. This simply is not true. In fact, we've taken every step to put our company at the forefront of privacy protection. Further, Lucy.com's privacy policy and practices have always been approved by TRUSTe, an independent, nonprofit organization that promotes the use of fair information practices on the Internet. We believe customers own their personal information, and we respect their need to fully control how that information is used.

Deborah Pleva
Public Relations Manager
Lucy.com
Portland, Ore.

The editors reply: In the article mentioned above, CIO *wrote only that Interhack had reported that Lucy.com had sent personal information to the marketing company, Coremetrics. Lucy.com, by its own admission, uses Coremetrics as a third-party service provider to gather and analyze information about how customers shop in its online store. Whether or not this is a misuse of customer data depends on one's point of view. Interhack hacker Matt Curtin claims that simply sending data to Coremetrics is a dangerous practice because "the design and implementation of the Coremetrics eLuminate service makes it* possible *[emphasis Curtin's] for Coremetrics to track a user who goes from site to site and to build a detailed dossier that includes the sum of all information leaked to third parties." Curtin has no evidence to suggest that anyone at Coremetrics has ever built such a dossier, however.*

Here at CIO, *we view this debate as evidence that at this point in the development of new e-commerce business models, the definition of misuse of personal information is in the eye of the beholder, and that even those companies with privacy practices that are endorsed by watchdog groups such as TRUSTe may not escape criticism from privacy advocates.*

CORRECTIONS

The company with which the state of North Carolina contracted to develop its North Carolina@Your Service Web portal ["Redtape.gov?" Sept. 1, 2000] is Andersen Consulting, not Arthur Andersen.

Contrary to what we reported in "Hands Across the Waters" [Sept. 15, 2000], LiquidPrice.com's website was not developed in India, but by LiquidPrice and SeraNova engineering staff at LiquidPrice.com's headquarters in California. We regret the error.

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Edited by Sandy Kendall

BRAND MANAGEMENT

Out, Damned Dot!

By Angela Genusa

DID SOMEONE SAY "dotcom"? Wash your mouth out with soap.

Dotcom, it seems, has become a dirty word. The suffix has fallen out of favor with the masses, who've had it up to here with havoc on the Nasdaq, dotcom ads, dotcom get-rich-quick schemes, dotcom pink slips and dotcommers driving real-estate prices sky-high. Now some companies, wary of skepticism from investors, are washing their hands—and their company's names—of the offensive suffix.

Companies that did so this year include J2 Global Communications (formerly Jfax.com), LifeMinders (formerly LifeMinders.com), Varsity Group (formerly VarsityBooks.com), Network Commerce (formerly ShopNow.com) and Preference Technologies (formerly Stockup.com). Chairmen of two other former dotcoms referred to the image of "flaky startups" and "companies with no business model and no hope of success" in public statements explaining their name changes, disdainful as if scraping dotcom doo-doo from their shoes after a walk through a pasture.

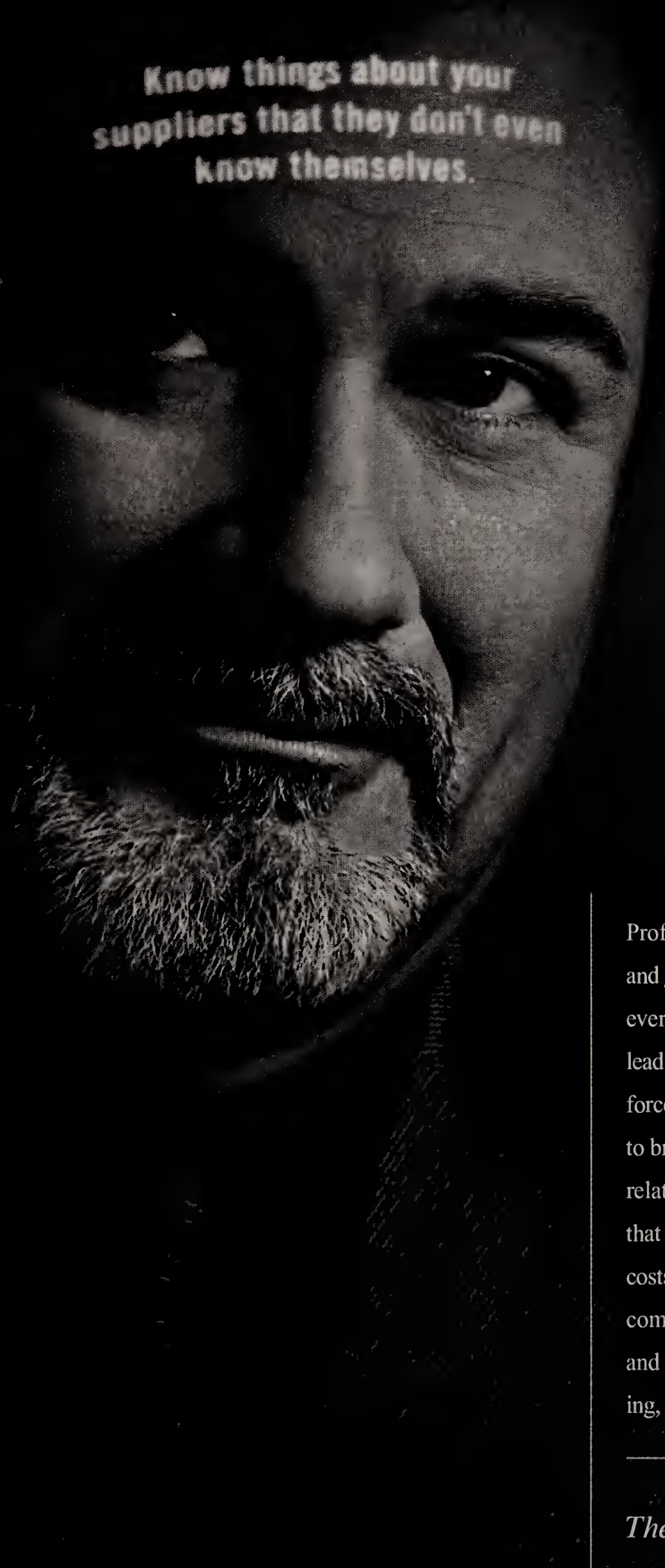
Businesses that support dotcoms are also avoiding the d-word. "Earlier this year, big companies couldn't say enough about their dotcom clients and how they were supporting them," says Preston Dodd, site operations analyst with Jupiter Research in New York City. Not now.

For companies heavily invested in dotcom-related identities, marketing and advertising, however, dumping the suffix isn't that simple. Take Sun "We're the dot in dotcom" Microsystems, for example, which proclaimed, "We're dotcomming the world." Or the domain-name registration company Network Solutions Inc. (NSI), "the dotcom people" who still have some dotcom domains they'd like to sell you from their site (*dotcom.com*). But, Dodd says branding yourself as the power behind the dotcom isn't necessarily a negative. "If you're supporting the dotcoms and the infrastructure, you're going to be making money, so it's OK. If you are the dotcom, [however,] it smacks more of startup and short shelf life."

For now, in any case, dotcom isn't going away. Companies that apply for a commercial use domain name have no choice but to take the suffix. During the second quarter of 2000, the NSI added 5.6 million new domains to its registry, 77 percent of

(continued on Page 40)

ILLUSTRATION BY JEFF SHELLY



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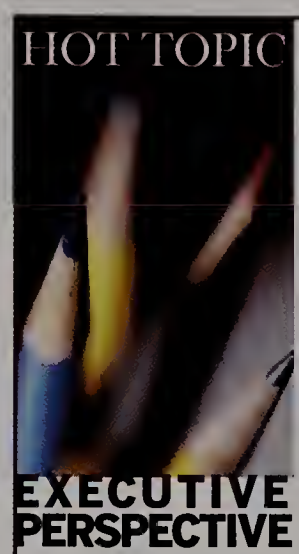
Out, Damned Dot!

(continued from Page 38)

which were dotcom. Companies also continue to stake their claims to trademarks that include ".com." All that may change, however, when the Internet Corporation for Assigned Names and Numbers, the nonprofit responsible for domain-name management, approves new suffixes for top-level commercial domains, such as .store or .site (still pending at press time).

And what about the Dallas computer systems manager who legally changed his name from Mitch Maddox to DotComGuy, became a shut-in and pledged to live solely off the Internet for a year beginning Jan. 1, 2000? Will he become just "Guy"? "As long as I can be a spokesperson for my website (*dotcomguy.com*) and its community, I'll keep the name DotComGuy," he says. "Eventually when the name is established enough, I'll change my name back."



What CEOs Really Want

By Meg Mitchell

THERE'S NO DOUBT that the role of the CIO is changing. The question is, into what? According to a study by The Impact Programme, a U.K.-based consulting company, CEOs have three expectations for the CIO of the future: agility, confidence and technology translation. Impact surveyed U.K.-based CEOs in a variety of industries. Lynn Mercer, one of the study's authors, explains: As business executives garner a basic understanding of technology, "the unique selling point will be people who can look at technology in its wider sense and translate the opportunities and threats for the business." That doesn't mean that the need for CIOs to understand business strategy is fading anytime soon. "It's not replacing the need for business knowledge. It's adding to it," says Mercer.

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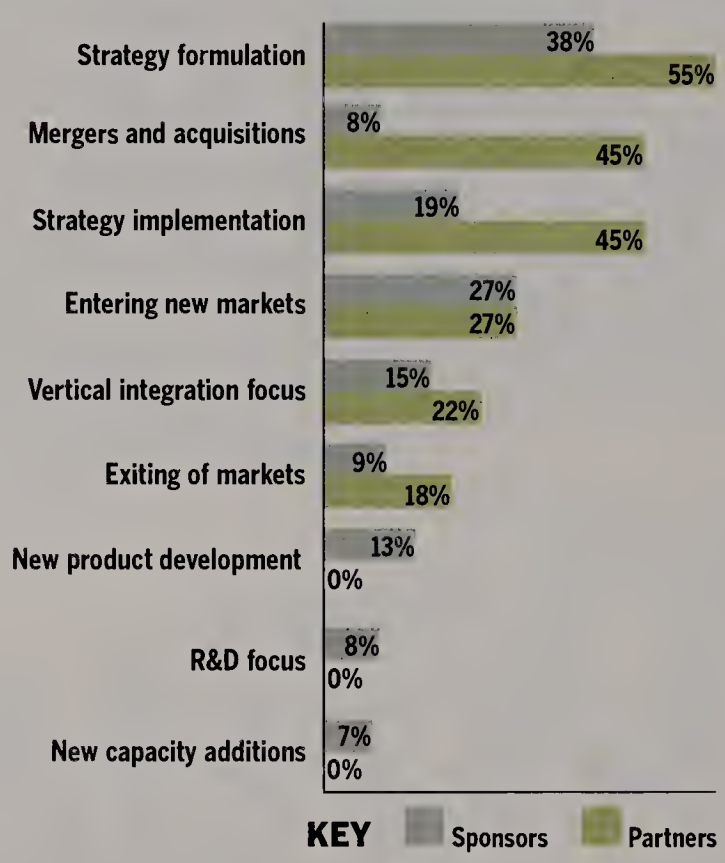
By the Numbers

Compiled by Susannah Patton

Competitive Intelligence Tips

BY ANALYZING RIVALS' moves, competitive intelligence (CI) programs allow companies to anticipate market developments rather than merely react to them. The American Productivity & Quality Center (APQC) recently concluded a benchmarking study comparing the CI practices of 12 identified best practices companies (partners) with 19 sponsor organizations looking for ways to improve their intelligence programs. While most of the companies surveyed use a corporate intranet to disseminate information on competitors, APQC found that best practices organizations share the most sensitive information only with senior management.

Key Business Decisions Influenced "To a High Extent" by CI Information



Extent to Which Your CI Function Uses IT for the Following Purposes
(1 = to no extent; 7 = to a high extent)

	Sponsors	Partners
Disseminating intelligence	5.5	6.1
Strong information so that it is accessible	5.1	6.0
Sharing information between functional groups within the organization	5.4	5.3
Collecting information from external sources	5.9	5.3
Consolidation of different internal and external sources of CI	5.0	4.9
Facilitate the usability of CI through filtering, packaging, etc.	4.6	4.8
Collecting information from within the organization	4.7	4.1

Best Practices

1. **Don't skimp.** A hefty investment in CI can pay off quickly, says Farida Hasanali, an APQC project leader and study team member. For example, Houston-based Compaq ponied up a "sizable investment" for its CI program, not including salaries, Hasanali said, allowing the company to quickly assemble a vast electronic library of analyst reports and competitive data. Employees can find about 80 percent of the information on the intranet, while the 20 percent intended only for the senior leadership team is kept on a separate server.

2. **Don't get discouraged.** Even if you don't have $1 million to spare, you should go all out to build a CI program. Houston-based Shell Services International, an IT services group within Royal Dutch/Shell Group, dedicated one employee for three months to build a CI website. "It's all right to start small if you have to," Hasanali says. "We all have the Internet to gather data."

3. **Get the word out.** IT is essential in creating a CI program, but companies should make sure they aren't hiding behind their intranets. "If people in the company don't know the CI team, they won't trust the information," Hasanali says. CI professionals should go to department meetings to seek out intelligence needs while raising their visibility.

4. **Establish clear objectives.** Make sure your goals are clear to top management. At Compaq, CI goals include speaking to top executives and providing opinions on when to release products. If a company is vague about a CI initiative's scope, it will be more difficult to make strategic decisions.

SOURCE: THE AMERICAN PRODUCTIVITY & QUALITY CENTER IN HOUSTON

Suggest future topics to **numbers@cio.com.**

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MOBILE COMPUTING

Up in the Air

By Stewart Deck

GERRY PURDY HEARS it every time he flies: "Please turn off all portable electronic devices until the flight crew indicates it is safe to use them."

Purdy, the CEO of PortableLife.com in Cupertino, Calif. (*www.portablelife.com*), a Web portal for mobile-device users, just isn't too sure about whether there's a big danger or just a whiff of scam in the air.

In a recent open column on his website aimed at the Federal Aviation Administration (FAA), Purdy urged the government agency to drop the ban on shutting down portable computers during takeoff. "It doesn't appear to me that there is anything that a portable computer is doing that could affect the navigation of the airplane," Purdy says. "Laptops don't emit radio transmissions unless someone plugs in a wireless modem, and every manufacture of laptops builds significant shielding into its product so that it generates little noise or electromagnetic radiation."

The FAA's complete ban on transmission devices (such as cell phones and modems) and limited use of electronics stems from a 1996 test run by the Radio Technical Commission for Aeronautics (RTCA) which showed that some toys and gizmos caused interference with cockpit flight instruments. The FAA says that as long as there might be even the slightest possibility of such trouble the current procedure and ban will stand.

In testimony before Congress last July, Thomas McSweeny, the FAA's associate adminstrator for regulation and certification, gave this testimony about portable electronic devices: "The findings of the [RTCA] studies indicated that the probability of interference to installed aircraft systems from PEDs (portable electronic devices) was low. However, the possibility of interference to aircraft navigation and information systems during critical phases of flight should be viewed as potentially hazardous and an unacceptable risk for aircraft involved in passenger operations." The potential for personal injury to passengers is the FAA's "paramount consideration," McSweeny added.

Purdy says he's all for safety, but counters that the airlines themselves might have an interest in keeping the status quo. Much like movie theaters that ban outside food so that they can sell $5 buckets of popcorn and $2 candy bars, airlines can sell phone service to passengers if they have a starving audience.

Curiously, section 91.21 of the Federal Aviation Regulations provides for a few PED exceptions, and the following items can be used during takeoff and landing: voice recorders, hearing aids, heart pacemakers (thank goodness) and electric shavers. So the bad news is that the FAA is still requiring you to turn off your laptop for a few minutes. But fortunately you can use those moments to squeeze in a quick shave.

Fear of Flying

THE FOLLOWING LIST of flight truths is adapted from an item in *Australian Aviation* magazine.

1. Every takeoff is optional. Every landing is mandatory.
2. Flying isn't dangerous. Crashing is what's dangerous.
3. It's always better to be down here wishing you were up there than up there wishing you were down here.
4. The only time you have too much fuel is when you're on fire.
5. The propeller is just a big fan in front of the plane used to keep the pilot cool. When it stops, you can actually watch the pilot start sweating.
6. A "good" landing is one from which you can walk away. A "great" landing is one after which they can use the plane again.
7. The probability of survival is inversely proportional to the angle of arrival. Large angle of arrival, small probability of survival and vice versa.
8. There are three simple rules for making a smooth landing. Unfortunately no one knows what they are.
9. You start with a bag full of luck and an empty bag of experience. The trick is to fill the bag of experience before you empty the bag of luck.

ILLUSTRATION BY JEFF SHELLY

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GLOBAL ISSUES

Spread the Word

DEC. 1 IS WORLD AIDS Day and has been since 1988 when the World Summit of Ministers of Health on Programs for AIDS Prevention called for a way to open channels of communication, strengthen the exchange of information and experience, and forge a spirit of tolerance. Since 1988, World AIDS Day has received the support of the World Health Assembly, the United Nations system, and governments, communities and individuals around the world. Each year, it is the only international day of coordinated action against AIDS. Each year the day has a theme; this year's is "AIDS: Men Make a Difference."

For more information contact:

World AIDS Coordinator Andrew Doup at 20, Avenue Appia, CH-1211 Geneva 27, Switzerland; *doupea@unaids.org*.

Or visit these websites:

UNAIDS (*www.unaids.org*) Information about worldwide campaigns and action for education, prevention and treatment of HIV.

AIDS Action (*www.aidsaction.org*) General information site on the disease and what's being done to combat it.

Canadian Worldwide AIDS Foundation (*www.wwaf.org*) Information about the foundation, its activities and how you can get involved.

INFORMATION DELIVERY

Paper View

By Lee Pender

ONLINE NEWS DELIVERY is getting better...but CIOs might not notice. Reuters, the British news service, recently adopted an entire programming language devoted to the delivery of online news. NewsML, a derivative of extensible markup language (XML) brings to websites a single news package that can include stories, photos and video clips in a variety of languages and tailored to a variety of different platforms.

However, advances in online news delivery still cannot give CIOs the time they need to read news online. A recent survey by RHI Consulting revealed that only 33 percent of CIOs surveyed ranked the Internet as their favorite medium for reading tech-industry news. In a development that should cause paper producers to breathe a sigh of relief, old-fashioned industry magazines topped the survey, with 39 percent of the CIOs in the sample tagging publications as their primary source for tech news.

One of the barriers to online news in the technology industry is the proliferation of sources. CIOs say they simply do not have time to sort through source after source looking for a news tidbit or reading the same stories over and over. Amber Niven, vice president of IT at Arch Wireless in Jackson, Miss., says she uses e-mail newsletters to filter and deliver news for her. Niven says she clicks links to stories she finds interesting but generally stays away from hitting tech news sites one by one.

Carolyn Knight agrees. The director of IT at Implant Innovations, a dental-products company in Palm Beach Gardens, Fla., says she saves most of her tech-news surfing for days in which a big story breaks. On the average day, however, she usually combs e-mail newsletters for "whichever [story] has the catchiest headline." Knight says she is more likely to type in a link from a print magazine than she is to surf online. However, she says the next news revolution might be the one to attract her attention.

"If [tech news] gets to wireless, it might be different," she says. But, for now, paper still rules in the CIO's office.

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VALUE

Rip-Roaring Algorithms

FOR YEARS, WHEN traders and corporate investors wished to identify the stocks in a money manager's portfolio and scout for rising stars, they had to pay an outside service or scroll through Securities and Exchange Commission (SEC) filings themselves. Either way, the process was tedious and costly. Even with sophisticated software, a simple search could take hours and creating a database was a manual operation.

Today, there's a Web-based application that does these types of searches for free. Hatched in the lab of New York City-based Worldly Information Network, the software includes proprietary parsing algorithms that scour documents for the appropriate information.

According to Ken Zockoll, managing director of database development, these algorithms automatically scan documents and upload data at a rate of more than 250 lines per second. "The information our product obtains provides customers with great market intelligence," says Zockoll, noting that the program is written in Perl and Visual Foxpro.

The program is available free at *www.lionshares.com*, but the company plans to charge a monthly fee of $6.50, starting Jan. 1, 2001. Worldly Information's next iteration of the product (due Dec. 1) will include an algorithm to track mutual fund information and a Java applet that chronicles SEC filings in real-time.

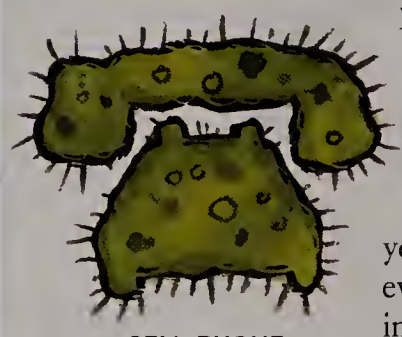
–Matt Villano

COMMUNICATION

Legitimizing Geek-Speak

By Sarah D. Scalet

WHEN YOU USE your trackball to cybersurf to a few homepages and multitask by answering your cell phone (after checking the caller ID, of course), you might not be as big a geek as you think. In fact, you might be just an everyday netizen using words now considered words by the folks who created the newest edition of a classic dictionary.



CELL PHONE

From *applet* to *zine*, 8 percent to 10 percent of the 10,000 words added to the *American Heritage Dictionary, Fourth Edition* (Houghton Mifflin, 2000), are technology terms, says Joe Pickett, executive editor of the dictionary. Technology is a major area of linguistic innovation, making it hard to keep up. For example, *dotcom* was one of the last words added to the roster; within months, it was everywhere. "If we had left it out, we'd have felt like we missed one," Pickett says.

FLASH MEMORY

PERSONAL DIGITAL ASSISTANT

So what did the dictionary digerati purposely slight? A litany of *cyber*-words and *e*-words, for starters; instead, editors included the cyber- and e-prefixes and trusted readers to figure out meanings on their own (although a few, such as *e-cash*, made the cut). Some words got pulled too. The 1992 tome included such now-obvious terms as *pocket calculator* and *electronic flash* and archaic ones such as *RPG* (a business programming language) and *data diddling* (a crime involving the illegal manipulation of data). "At one time, these seemed very important," Pickett says, chuckling at the idea of someone wondering about, say, a calculator small enough to fit in a pocket. "It's very difficult to tell which ones are going to last."

A SELECTION OF *AMERICAN HERITAGE*'S NEW WORDS:

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cell phone
cybersurf
defrag
dial-up
digerati
dot-com
ethernet
expansion board
feedhorn
file transfer protocol
fire wall
flash memory
home page
intranet
markup language
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BUSINESS PRINCIPLES

Theory Seeks Practice

By Thomas G. Dolan

IT SEEMS THERE'S a new tag line for business concepts every few months. Take revenue performance optimization (RPO), for example. It's a methodology designed to help companies manage revenues, especially during rapid growth. But isn't this what companies have always tried to do? Of course. But the times have changed, say RPO's adherents, and RPO is designed to adjust to this change.

"Executives have spent their careers managing hard financial assets," says Floyd Kvamme, partner at venture capital company Kleiner, Perkins, Caufield & Byers. He's also a member of the board of directors at Brio Technology, the Santa Clara, Calif.-based company that recently donated $1 million to the Columbia University Graduate School of Business in New York City, for the study and analysis of the RPO concept. "In 1978, 83 percent of the market capitalizations of nonfinancial companies was made up of plants, real estate and equipment," Kvamme explains. "In 1998, those had shrunk to only 31 percent. It's a new game. Executives must manage their new assets." Those assets are the knowledge of a company's top performers, which has never been sufficiently tapped before.

In theory, RPO will help companies improve revenue from their existing businesses by as much as 10 percent to 30 percent by better managing information assets. But how?

RPO goes beyond expense control through budgeting to establishing repeatable methodologies based on the practices of top performers, says Nelson Fraiman, a professor and codirector of Columbia's W. Edwards Deming Center for Quality, Productivity and Competitiveness. Companies will thereby discover ways to more efficiently tap their current customer base, offer the sales force more qualified leads and supply product bundles more closely matching market demand.

Technology enables the RPO process, but Fraiman says the school will not be tied to any one vendor.

Janet Dang, general manager of applications at Brio, says the company's gift is not simply altruistic: "We look to Columbia to develop RPO's scientific plans and practices, which we and our customers don't yet know how to pursue." Stay tuned.

METRICS

iPlace or Yours?

THEY SAY THE grass is always greener in someone else's yard, and with iPlace (*www.iplace.com*) you can find out just how much greener. Enter your address in the site's valuation program, and the site presents you with real-time information about properties around it, including the date they were sold and how much they cost. iPlace gives access to the average age of the residents, typical housing type and even average income in a specified neighborhood.

To use the site's more advanced tools, such as getting a credit report or tracking finances, you must enter a social security number and other personal information. The privacy policy states that this information will not be given out without your consent. In an effort to avoid concerns about divulging private information, iPlace gathers an opt-out policy in its privacy section that links users to a website explaining how to keep their information anonymous. Robert Wheeler, iPlace's chief privacy officer in Orange, Calif., says, "We have not experienced any major [privacy] problems on our side. We're up front about how we're going to use the information once we gather it."

–Stephanie Viscasillas

"PRESENTLY THERE'S NO ACCOUNTABILITY FOR I.T. SCREWUPS; BUT BY 2004, EGREGIOUSLY BAD DECISIONS IN I.T.-ENABLED VALUE CREATION WILL BE CONSIDERED MALFEASANCE. PEOPLE WILL GO TO JAIL."

–Thornton May, corporate futurist and chief awareness officer, Guardent

PHOTO BY TONY STONE

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SCREWDRIVERS, SOCKET WRENCHES and car lifts are just some of the tools that Saab technicians use to repair the cars they see every day. They're all standard issue for the company's approximately 255 dealerships and service facilities in the United States, and right alongside them are the technicians' PCs. These days the lower-tech items outnumber computers by about 20 or 30 to one, but according to company officials those ratios are about to change.

Executives at Saab Cars USA confirmed that the company plans to increase the number of PCs in its dealerships. In fact, the board decided that by March 31, 2001, every facility must have at least one computer for every four technicians, with that ratio enforced through the usual regular site inspections (along with safety precaution checks and so on). John Libbos, manager for Saab Cars USA service operations in Norcross, Ga., says these new machines should make it easier to diagnose car problems, and provide technicians with valuable news and parts information by connecting to a special maintenance-only intranet.

"The PC is becoming just like any other tool our service personnel use in their daily activities," Libbos says. "For this reason, we want the machines to be available to every technician at all times."

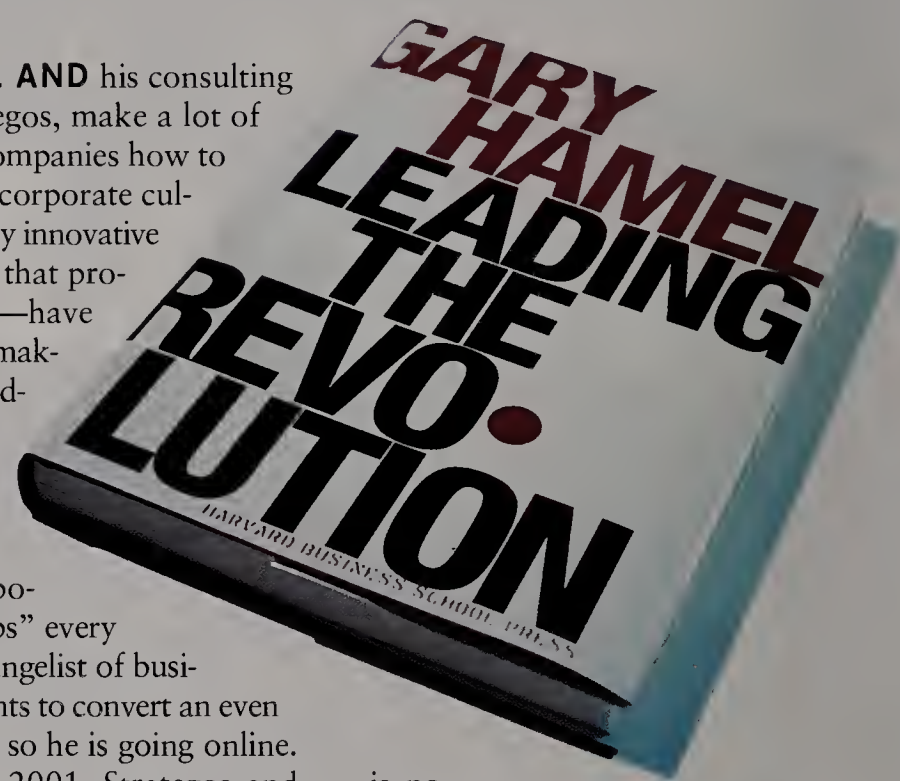
Libbos estimates the plan will bring more than 100 new computers into the company's U.S. dealerships. Saab Cars USA won't foot the bill for the approximately $1,200 machines but plans to subsidize a percentage of each facility's purchase depending on how many PCs one shop buys. He adds that the company's IS department will provide software and online training tutorials for technicians who'll use the new machines.

–Matt Villano

INNOVATION

Learning Creativity

By Alison Bass



GARY HAMEL AND his consulting company, Strategos, make a lot of money telling companies how to transform their corporate cultures so that really innovative ideas—the kind that produce an eBay—have some chance of making it to the boardroom. Hamel also offers a streamlined version of his insights at corporate "boot camps" every year. But the evangelist of business strategy wants to convert an even larger audience, so he is going online. Starting in mid-2001, Strategos and Quisic, an e-learning company, will teach radical innovation via the Web.

The venture is not without risk. While e-learning is the fastest growing segment of the corporate IT education market—capturing $3 billion in revenues last year—until now it has filled a relatively narrow niche: training technical personnel in Java or teaching employees how to navigate Microsoft Excel or Lotus Notes. Menlo Park, Calif.-based Strategos, partnering with Quisic (formerly UniversityAcess) in Los Angeles, is the first to try to teach creative thinking over the Web. As Hamel notes in his new book, *Leading the Revolution* (Harvard Business School Publishing, August 2000), it's hard enough to get traditional corporations to even acknowledge that the way they're doing business—incrementally improving products, for instance—is no longer sufficient to survive in the new economy. So convincing those corporations to change their entire mind-set in order to harness the brains of everyone in the company for creating truly radical innovation and thus new business wealth—well, that's a formidable task even for highly paid consultants.

Hamel is banking on his online academy's reaching sufficient numbers of employees in a given corporation that change can sprout widely, like an overseeded vegetable patch. "One company may not be able to afford to send 10 people to one of our conferences, but I can get 10 people online to absorb our ideas," Hamel says with supreme confidence. "I'd like to close the yawning chasm between [having] new ideas and putting them into practice."

"IT IS BETTER TO KNOW SOME OF THE QUESTIONS THAN ALL OF THE ANSWERS."

–James Thurber, author and humorist

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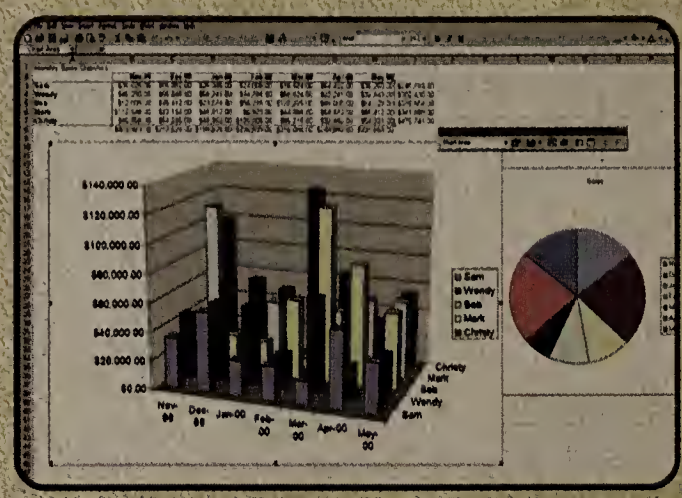

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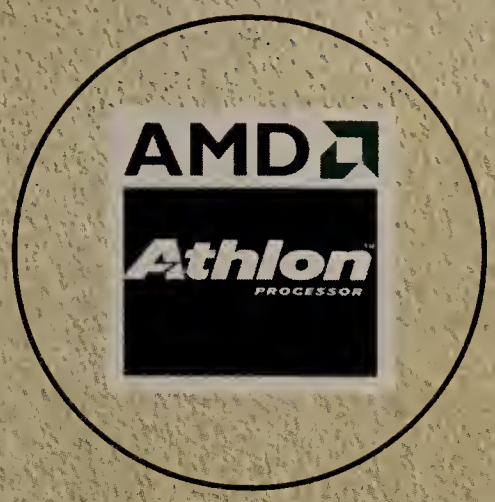

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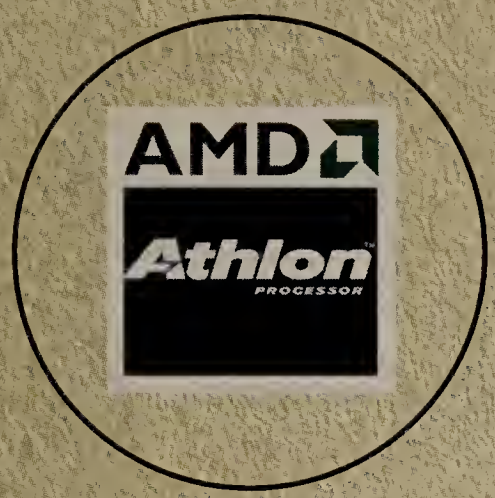

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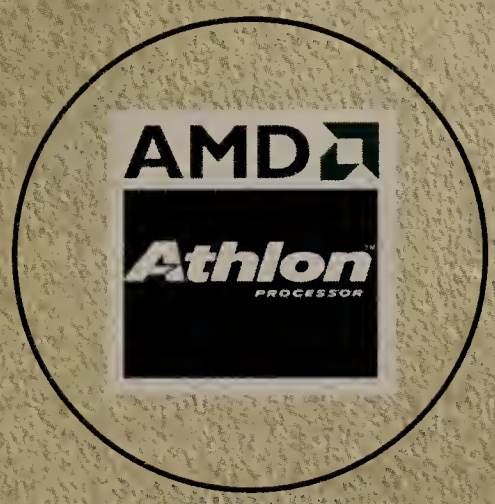

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Hot and Bothered

David Hume, vice president of permanent placement for St. Louis-based Bradford & Galt, answered readers' questions on CIO.com about why IT professionals become burned out and what managers can do to prevent it

Q: Information technology encourages talented individuals to job hop because demand is so high. IS departments hire young talent to minimize salary costs. When these employees build skills and confidence, they move on because they are given too much work to complete in Internet time. Any suggestions for retaining these talented people?

A: It's hard to fight the free market. If you're giving them marketable skills, about the only highly effective retention technique is to keep their salaries quickly escalating in step with their rising values in the marketplace. If some of that compensation is deferred and would create an incentive to stay around, that might be OK. A great 401(k), stock options or retention bonuses are all possibilities. Great managers also help. The more flexibility in the workplace, creative freedom and learning opportunities you provide, the better. But all of those things may be overshadowed by an offer of $20,000 more than what you're paying. You could also tie a tuition-reimbursement program into a contract that requires staying for a period of time to avoid repayment. But it isn't always productive to have someone stay just because they'd owe you a lot if they left. Usually they'll make you pay by producing less and by having a negative effect on morale.

Q: I work for a large Fortune 500 retailer. This company has been through an abnormal amount of executive management changes in a single year. Each change has brought with it different management styles and expectations. Over and over the employees have adapted and changed course. Now they are tired and becoming wary of the start/stop mentality. They have stopped thinking for themselves and are becoming cynical of moving forward with any agenda. Any ideas on how we can improve this situation?

A: The best option is to open up the lines of communication as much as possible. Being frustrated is one thing; being frustrated

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and feeling like you can't express your opinion is even worse. The management style at this company sounds very "top-down" and the constantly changing priorities and lack of buy-in are reflective of a disenfranchised staff. I would test the limits of how much information you can give the staff and try to keep them well-informed as to the direction of where things are going. I would also set up an avenue for them to share their frustrations or voice their concerns. You may not be able to solve all the issues, but you might find that there are some complaints that you can do something about. If, as midlevel managers, you just listen and understand the issues, you will likely gain more loyalty from the staff. If the corporation itself is working to demotivate staff (unintentionally perhaps), then trying to form a stronger team bond and more loyalty to the individuals they work for may be the best strategy. Even changing a few issues that are important to the staff will go a long way. If you try to hit upper management with complaints about its entire strategy and approach, you're unlikely to get anywhere and will appear disloyal. However, suggestions that look to change the practices rather than the philosophies may be effective, especially if the suggestions can be characterized in terms that will be good for the upper managers (like cost savings, reduced turnover, better adherence to deadlines and so on).

Being frustrated is one thing; being frustrated and feeling like you can't express your opinion is even worse.

Q: As my company's information technology leader, I have noticed a dramatic shift whereby we have become very project driven rather than using the strategic model we used to follow. With this change comes deadlines, pressures and stress because it is a very competitive environment. I used to have a good relationship with my development teams, project leaders and support staff, but now I notice problems such as tardiness and a certain sarcasm or silence when I approach them with new assignments. What can I do?

A: There is a lot to learn from the dotcom startup companies. They work their staffs into the ground in very high-pressure business situations. What they do right is accept their business climate and focus on what they can do to make the environment as hospitable as possible. If people are coming in late, maybe they need flextime. If the environment is high stress, then maybe they need some escape valves like a party, a catered lunch or a golf outing. Four-day workweeks are awfully hard to walk away from. Making things as relaxed as possible in terms of dress, management style and rules will help take the edge off. Of course, being able to bring your cat to work and wear cutoffs is appealing to some information technology professionals, but it's the stock options that keep them pushing over long hours. Though not everyone can offer stock options, building in a bonus system based on company and personal performance can really help to keep one pushing hard. It's easy to burn out when your efforts only seem to contribute to another's benefit. If you're included in the stake then it's a lot easier to stay fired up.

Q: My company is going through a major reorganization and this may potentially mean layoffs. Since March it has been announcing the reorganization in pieces. People are worried about their jobs and consequently most people have become so distracted by this issue that they aren't really trying to do their work anymore. A few of us still care. What can we do to stop from getting burned out?

A: I have seen reorganizations, even those with layoffs, create some tremendous opportunities for those that remain focused. Despite the reasons being given by the employer at the time of the layoff, it is usually assumed (and true) that a company is going to cut those employees who are most expendable. Staying fired up and productive is the best way to make sure that you don't end up getting the boot. Also, it is inevitable that some key people in the organization are going to either get laid off or they are going to seek other opportunities. Those that stay aggressive in their work are going to be in the best position to be recognized with promotions that become available. Just because your company is reorganizing and may lay people off doesn't mean that the salaries it's paying now don't deserve 100 percent productivity on the part of its workforce. You just have to decide that you're going to proceed as if things are normal and give it your all as a matter of pride. What better time to stand out then when others are being slackers. They are just going to help to make you look good and provide job security for you during the layoffs. CIO

Ask the Expert

Have a question about e-business integration? **John Orcutt**, CEO of Actional, based in Mountain View, Calif., will be available to offer insight and advice on seamlessly integrating online initiatives with the rest of the business. Post your questions for him until Dec. 15 at *www2.cio.com/CIO/expert* or e-mail questions to *asktheexpert@cio.com*.

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To recommend an expert for this column or suggest a topic, contact Senior Writer Daintry Duffy at *dduffy@cio.com*.

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Technical Difficulties

Leading a technical group requires the wisdom of Solomon

BY PATRICIA WALLINGTON

THE RESPONSIBILITY OF today's technical leader is awesome. The introduction of new technology touches everyone in the company with all the attendant changes and risks. And it never stops. Just when you have completed a full deployment, the next version is released and you start all over again. Searching for a stable state is fruitless. Today, transition is the stable state. As a result it is more important than ever to know how to lead and motivate your technical group. Developing the people and processes that support the ever-changing landscape can help mitigate the inevitable feelings of chaos.

The Technical Persona

Perhaps the biggest challenge is understanding the people you work with. Consider, for instance, that technical people are generally uncomfortable with uncertainty. The quest for certainty can lead to extensive periods of analysis, thus paralyzing the organization or project. Moving to a decision despite some uncertainty is vital. In this fast-moving field, by the time certainty is achieved the technology is obsolete. I once heard the professor at Harvard who was responsible for selecting the PC for incoming students say, "At the beginning of the semester I was a hero; by the end of the semester they were looking for the dummy who picked this obsolete technology."

In search of the perfect solution, most technical people become oblivious to time. On the positive side this makes them very dedicated, hardworking individuals who frequently work crazy hours to achieve their objective. On the other hand, the perfect answer delivered too late is useless. Driving to conclusion in an established time frame is important to success. If the competitor's product gets to the marketplace before yours it will achieve marketplace advantage. Of what comparable value will the extra 1 percent to 2 percent of perfecting be?

I have developed more ways to ask, "What other alternatives did you consider?" than you could imagine. But I have never found an approach that brought joy to the heart of the questionee! It seems that once the technical person has decided

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862 Shipping Schedule
863 Report of Test Results
864 Text Message
865 Purchase Order Change Acknowledgment/Request - Seller Initiated
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868 Electronic Form Structure

AUTHOR Authorization message
BALANC Balance message
BANSTA Banking status message
BAPLIE Bayplan/stowage plan occupied and empty locations message
BAPLTE Bayplan/stowage plan total numbers message
BMISRM Bulk marine inspection summary report message
BOPBNK null
BOPCUS Balance of payment customer transaction report message
BOPDIR Direct balance of payment declaration message
BOPINF Balance of payment information from customer message
BUSCRD Business credit report message
CALINF Vessel call information message
CASINT Request for legal administration action in civil proceedings message
CASRES Legal administration response in civil proceedings message
CHACCO Chart of accounts message
CLASET Classification information set message

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CNTCND Contractual conditions message
COACSU Commercial account summary message
COARRI Container discharge/loading report message

274 Healthcare Provider Information
275 Patient Information
276 Health Care Claim Status Request
277 Health Care Claim Status Notification
278 Health Care Services Review Information
280 Voter Registration Information
283 Tax or Fee Exemption Certification
284 Commercial Vehicle Safety Reports
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434 Railroad Mark Register Update Activity
435 Standard Transportation Commodity Code Master
436 Locomotive Information
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823 Account Analysis
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943 Warehouse Stock Transfer Shipment Advice
944 Warehouse Stock Transfer Receipt Advice
945 Warehouse Shipping Advice
947 Warehouse Inventory Adjustment Advice
990 Response to Load Tender
993 Secure Receipt or Acknowledgment
996 File Transfer
997 Functional Acknowledgment
998 Set Cancellation

CODECO Container gate-in/gate-out report message
CODENO Permit expiration/clearance ready notice message
COEDOR Container stock report message
COHAOR Container special handling order message
COLREQ Request for a documentary collection message
COMDIS Commercial dispute message
CONAPW Advice on pending works message
CONDPV Direct payment valuation message
CONDRA Drawing administration message
CONDRO Drawing organisation message
CONEST Establishment of contract message
CONITT Invitation to tender message
CONPVA Payment valuation message
CONQVA Quantity valuation message
CONRPW Response of pending works message
CONTEN Tender message
CONWQD Work item quantity determination message
COPARN Container announcement message
COPAYM Contribution payment
COPINO Container pre-inspection message
COPRAR Container discharge/loading order
COREOR Container release order message
COSTCO Container stuffing/stripping message
COSTRI Container stuffing/stripping instruction
CREADV Credit advice message
CREEXT Extended credit advice message
CREMUL Multiple credit advice message
CUSCAR Customs cargo report message
CUSDEC Customs declaration message
CUSEXP Customs express consignment declaration message
CUSPED Periodic customs declaration message
CUSREP Customs conveyance report message
CUSRES Customs response message
DEBADV Debit advice message

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on the solution, it is elevated to the level of the Holy Grail. Any suggestion that there might be another solution is viewed as an attack on their competence, on their ethics or something else. Yet it is important for you as the group leader to understand which things were considered and ruled out.

Passion, so much a part of the technical persona, sometimes leads to wishing and hoping for things to be different than they truly are. In one company, I observed an energy-filled discussion of a project with a great rate of return; it was really beneficial to the business, but the organization did not have the cash flow or capital budget to support it in the current year. It was extremely difficult for the project manager to accept that reality. The project was tabled until the following year. The project manager swallowed his disappointment and took a big step into the real world of business.

One of the primary benefits the technical leader can bring to the organization is balance. Balancing the business and technical continuum is a constant challenge—as is striking the right balance between people and projects. Balance is crucial at a time when choices have moved from "either/or" to "and." How many times have you been asked this question (or one like this), "What is more important? Customer satisfaction or financial results?" The answer is "Yes." They are both important. While making decisions in the outsourcing project at Xerox, many times we were faced with the seemingly competing objectives of caring for our people and getting the best financial contract. Only by understanding that success did not fall within either people or the bottom line, and persistently working toward both of those objectives did we achieve what we set out to do.

One of the biggest pitfalls is allowing all solutions to be driven by technology.

And let's not forget the ever-challenging quest to balance our work life and our family life. No matter how critical the work, the best leaders understand the need to support their people as they struggle to achieve balance in their lives.

R-E-S-P-E-C-T

Gaining the respect of the group is paramount. Technical people tend to respect those who have the same (or higher) level of intelligence and knowledge of technology as they possess. If you come from a technical background, you will inevitably earn respect based on your technical knowledge and accomplishments. Your challenge will be to develop the executive presence and credibility to represent the group's interests and garner for its members the recognition they deserve. Coming from a business background poses the challenge of figuring out what level of technology knowledge you will need to ensure the effectiveness of your leadership. It is a mistake to try to "become an expert." Learn enough to ask the right questions and be able to test the adequacy of the answers. Your greater knowledge of the business and the freedom to rely on the experts should ensure the respect of the group.

One of the biggest pitfalls in leading a technical group is to allow all solutions to be driven by technology. Given the intense focus of those working in this field, there is a tendency to see everything through the lens of technology. While many aspects of business today are based on technology, it is still important to keep "the technology for technology sake" out of your decision-making process.

Know When to Fold Them

One of the lessons I observed over the years is, "It's easier to keep a failing project going than to cancel it." No one relishes this task. The technical team is eternally optimistic that they can make it work. Yet, the astute technical leader knows when a project has reached its waterloo. That is the time to call a halt. While these decisions take courage, continuing to stumble forward is the real failure. It hurts everything: morale, credibility and company results.

Here are a few other things you may want to consider. Be sure a direction is set and communicated. Everyone likes to know where they fit in. Communicate, communicate and communicate! To senior executives, with your peers and to the organization: Continue building relationships; keep your own skills current; stay balanced; promote holistic thinking; leverage the positives; provide a learning environment so that everyone grows in capability; and inject some fun.

Sometimes the smallest things have the biggest effect. I once had a group that was located in the basement of our building. It was wonderfully decorated with bright colors, nice furniture and artwork, but it was the basement. Clearly their self-image as a group was hurt by this location. They were embarrassed to bring customers to their office. After a lot of discussion, I arranged to have them moved to another location. In their eyes, this was the greatest accomplishment of my leadership tenure. Morale went up, productivity went up, employee satisfaction went up. Even our customers were happier. For some, it wouldn't matter. For this group it mattered, so I did something about it. CIO

Do you have any stories to share about the challenges of technical leadership? Let us know at *leadership@cio.com*. Wallington, who is now president of CIO Associates based in Sarasota, Fla., retired from Xerox in 1999, where she was CIO. In 1997, she was inducted into the Women in Science and Technology Hall of Fame and named by *CIO* as one of the 12 most influential IT executives of the decade.

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Career Counsel

Mark Polansky Offers Advice to Aspiring CIOs and IT Managers

Palm Piloting

Q: I'm 33 years old, I have seven years of IT experience as a developer and project manager, and already make a six-figure salary. My career goals include becoming a CEO by way of the CIO/CTO position. My undergraduate degree is in computer science, and I'm working on two master's degrees in business administration and finance. I spend about 90 percent of my off-hours learning about the business side and the rest on the technical. Since a CIO-level position is probably not my next move, am I spending too much time looking far into the future? Should I be spending more time on the technical issues that have led me to where I am now? Is there a proper balance between the two?

A: You are doing just fine. To have such a clear and articulate vision of your career goal—and to be able to prepare for it early—is an exceptional gift. Over the course of an IT career, the balance of the technical and the nontechnical (business and leadership) content is a blend that starts out nearly 100 percent technical and winds up nearly 100 percent nontechnical. Your current role as project manager, while it will indeed vary from company to company and from project to project, should be about fifty-fifty. So you are at the point of equal emphasis and are certainly heading more strongly toward the softer side of your skill set. The MBA is right on target, and the master's in finance could be a real help in ultimately running a business or a corporation. Because you are doing these at the same time, you should focus your MBA on topics other than finance, such as marketing, e-commerce and management.

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Q: I am the operations manager at a midsize investment company, and I have built the department from scratch. I have extensive technology and management experience, but I am lacking specific business knowledge and application software development experience. In the meantime, I am finishing my bachelor's degree in business management. I study business and finance, and I plan to continue my education toward an MBA. I'm just not

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sure what I can or should do next. I think I could be a great IT leader—CIO or CTO—but I enjoy being both a first- and mid-level manager. I am very comfortable with day-to-day operations but would like more experience with planning and strategy. How should I be spending my time in my current job, and what schooling should I look for a year from now?

A: This is pure-play career counseling: You are a perfect candidate for a small shop CIO! You enjoy the everyday operational and managerial activities, and you are also attracted to the more managerial, administrative and strategic facets of IT. In a small shop, you can be the top IS leader and still remain close to the firing lines. Focus both your work and further educational efforts on acquiring a more balanced background in business issues and systems topics like enterprise resource planning, customer relationship management and e-commerce, which will supplement the technical and IT operational expertise that you have mastered.

IS management attracts and engages me, but there is a "pay your dues" atmosphere that I do not know how to confront.

TEMPORARY FIXES

Q: What does your research show regarding companies that use temporary CIOs until they find a permanent executive? Is this an increasing trend? And which sourcing companies are placing executives in this temporary capacity?

A: Upon losing a chief information officer, the vast majority of enterprises will quickly move to either promote from within or engage the services of an executive search company to look outside the organization. In the latter case, the CIO's direct supervisor and occasionally a member of the CIO's staff or a non-IT senior manager from another department will most often take control of the IT function until a replacement can be found. It is generally viewed as more disruptive to bring a short-term, temporary CIO from the outside and create change, only to repeat the process a few months later when the search is completed.

In a growing number of instances where IS is not fulfilling its charter or is a troubled department, a "hired gun" CIO is engaged for the purpose of not only management continuity but also of turning the shop around and preparing it to be taken over by a permanent steward. The leading search companies in this space are staffed by former CIOs who have moved on to a consulting business model: Aligne (Philadelphia), the Feld Group (Dallas) and Transition Partners (Reston, Va.).

PATIENCE IS A VIRTUE

Q: I'm a young database administrator, one year out of college, who recently and unexpectedly was promoted to data warehouse manager as the result of attrition.

On paper I have one year of IT experience, but like many in my generation, I've used computers for many years. As such, I'm quite comfortable with my technical background, and instead of studying mostly IT, I spent much of college trying to improve my leadership skills. While I'm delighted with my progress, my background puts me in an awkward position in a fairly large and conservative IS department. IS management attracts and engages me, but there is a "pay your dues" atmosphere that I do not know how to confront. I don't want to spend the next three or four years proving my merit on strictly technical terms—I've been doing that as a matter of course for much longer than nearly anyone in my department. I'm eager for more opportunities to participate in the process of envisioning and implementation. What to do?

A: Well, first let me congratulate you on your promotion. Second, let me counsel you that the next skill for you to acquire is patience. I know, I know. I was once a young buck, too, and I thought that I knew it all then—but I still don't! Your technical expertise, which spans far more than your one year of on-the-job training, has indeed been recognized. It's clear that you have been able to leverage the depth of your technical background into an early fast track in your professional career.

Now it's time to get the seasoning and maturing that only time can provide, regardless of how smart you are or how many years you have been computerized. As they say, there is no substitute for experience. Don't confuse your many years of hands-on computing and your college experience with experience in actual hands-on professional management of people, resources and corporate processes and politics. And while you are practicing and honing your leadership skills, seek out opportunities to do more in the areas of departmental strategy, planning and administration. Volunteer yourself and watch what happens.

IN FOR THE LONG HAUL

Q: I am a knowledge engineer in a corporate IS department with a focus on driving the removal of the root causes of IS-related

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problems and preparing IS customer service as new applications and other corporate initiatives are rolled out. I have 15 years experience and plan to stay with my current employer until retirement. My formal education is a bachelor's degree in computer science. I am returning to college for my MBA next year. Which MBA specialty would most help me advance my career?

A: Wow, I haven't heard that kind of loyalty statement in quite a while, especially from someone of your assumed age group of professionals with 15 years experience. Having said that, I could not begin to answer your question since you haven't told me what type of career path—technical, IT management, general management—you wish to pursue. Let your head and heart drive that decision, and then concentrate your studies on the appropriate and corresponding content. Also, since you plan to stay at that lucky company until gold watch time, add content relevant to your industry (for example, manufacturing, retailing, financial services and so on).

Have a career question?

Visit our website at *www.cio.com/forums/executive/counselor.html* and pose your own questions to Mark Polansky.

ON LEAVE

Q: I am enrolled in an MBA program and have elected to emphasize IT in my studies. I am also a new mother and would like to use the program to gain IT knowledge and skills that allow me to work from my home and spend more time with my child (and eventually children) while earning a decent income. What types of jobs and careers are best suited for a telecommuting scenario?

A: If you were a current corporate employee about to go on maternity leave, you and your employer would do well to set up any number of scenarios for continuing your work. Since you would already have knowledge of the company's business, processes, practices and the players therein, you could telecommute or work a combination of some days in the office and some days at home, and still make a significant contribution both technically and otherwise. In this case, however, it would be difficult to do much beyond subcontracted consulting, doing technically oriented development work remotely, or perhaps a combination of analysis and programming if you could get out and visit the client occasionally. Focus your MBA content on acquiring current state-of-the-art technical expertise, but don't ignore the management, finance, sales and marketing training that you will put to good use later on when you return to corporate life.

HEALTH-CARE BOUND?

Q: I will complete my Juris Doctor and MBA with an emphasis in health-care administration and e-business in a year. During my schooling, I have dreamed of becoming a CIO. While interning in the corporate IS department of a large health-care delivery network, I found that most people seem to be doing very little tangible work or analysis. I want a career in which there is a lot of decision making, analysis, teamwork, brainstorming, interaction and broad skill development. If I still want to be a health-care CIO, what type of job am I qualified for and what should I seek after graduation? Some have suggested being an analyst, but I fear that requires technical experience that I don't have.

A: In many ways, the advice you have received is pointed in the right direction. The broad category of analyst covers a lot of ground, and your best bet for leveraging your fine academic credentials and fulfilling your avowed vocational interests would be a position as a business analyst or, as it is often called, a business systems analyst. By any name, the role I refer to is one in which you spend a great amount of time with both business line management as well as information technology staff. Critical activities include aligning the IT strategy with the business unit's needs, reengineering business processes for operational efficiency and competitive advantage, participating in developing new business products and services as well as new revenue models and channels such as e-commerce.

To complicate matters, this type of position often reports to the business side rather than IT. In either case, you will be developing and exercising your analytical, problem-solving and critical-thinking skills while developing a strong working knowledge of the company's business, processes and operations.

As for becoming a CIO, spend some time in analysis before you cast that one in concrete. Time and experience will either reinforce that goal, in which case you should then build a technology/IT line management track record on top of your analytical foundation, or you may find yourself seeking operating management experience. Either way, I wouldn't recommend taking a job at your interning company—they seem to be asleep at the wheel! CIO

Mark Polansky is a managing director and member of the advanced technology practice of Korn/Ferry International in New York City. He is also the chairman of the Greater New York Chapter of the Society for Information Management. The Web-based Executive Career Counselor column is edited by Web Research Manager Kathleen Kotwica. She can be reached at *kkotwica@cio.com*.

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The Build/ Buy Battle

Balancing the risks and rewards of information service outsourcing

BY ERIC K. CLEMONS

ILLUSTRATION BY GERARD DUBOIS

IN THE ADOPTION of any new technology, companies always face the classic choice between "make" and "buy"—that is, between developing the technology themselves (insourcing) and buying it from outside (outsourcing). Both have advantages and disadvantages; the key to making a good decision is developing a good understanding of what they are. Having spent a dozen years studying the issue, by examining sourcing decisions with a range of corporations, participating in litigation in international outsourcing contract disputes and examining the economic theory through ongoing research programs at the Wharton School, we have developed a framework for anticipating and managing risks and achieving desired benefits through stable relationships. In this article, I'll focus on managing the risks of outsourcing; in my next column, I'll delve more into maximizing the rewards.

The Benefits of Outsourcing

In general, companies outsource when they expect to receive one or more of the following benefits:

- Lower cost, because the outsourcing vendor can produce software or operate systems more cheaply than the company can. Vendors often can offer such scale advantages by reusing code or sharing risk across a large book of contracts, for example.
- Increased flexibility, allowing the company to add capacity or reassign personnel as demand moves up or down.
- Faster speed in development, leading to reduced time to get a product or service to market.
- Some form of accounting advantage—by shifting resources off the balance sheet, the company can sometimes report a better return on assets.

So why don't companies outsource all their IT? Because outsourcing also poses a number of disadvantages. As in any other area of contracting, software outsourcing increases transaction costs—the costs of arranging to produce or purchase something rather than the direct costs associated with pro-

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ducing it or purchasing it. Some of these are frictional costs: It costs more to administer contract employees than it does to use in-house staffers, for example.

It may also cost more to develop a specification for an outside contract than it would to develop one for internal development. Moreover, legal costs associated with contracting and the expense of monitoring or measuring vendor performance may be higher than the comparable costs associated with internal activities.

There are also risk-based costs. That is, there may be a greater risk of deliberate contractual abuse, for profit, by an outside contractor than there would be from an internal development team. If these risks materialize—if the contractual abuses occur—they will produce real and potentially substantial financial costs.

Once a contract has begun, there are frequently few alternatives available to the client but to continue with the vendor that was originally selected.

The Risks of Outsourcing

Risks associated with outsourcing contracts are principally one of the following three types:

1. Shirking. This is when a vendor deliberately underperforms while claiming full payment. It may involve such tactics as billing for more hours than were worked and bait-and-switch staffing, providing excellent staffers at first and then replacing them with less qualified personnel.

2. Poaching. This represents the client's loss of control over an information asset that occurs when a vendor develops a strategy and a strategic application for one client and then redevelops the system for a second client. The second client's cost is likely to be lower, placing the first client at a disadvantage, rather than offering it a sustainable advantage. In the most extreme case, the vendor goes into the client's business and competes directly using the expertise it developed on the project.

3. Opportunistic repricing or holdup. When a company enters into a long-term contract, it is not uncommon for the vendor to try to change the terms at some point. "Vendor holdup" occurs when a vendor overcharges for unanticipated enhancements and contract extensions.

What makes these risks possible? In general, each occurs when the vendor sees a profitable opportunity that could not have been predicted or prevented by the terms of the contract.

For shirking to occur, for example, there must be some form of incentive differences between the client's interests and the vendor's interests—that is, some motivation for the vendor to act in its own interests and counter to those of the client. Second, there must be some form of uncertainty; shirking is a poor strategy if it can be detected and punished. Unfortunately, the difficulty and expense of careful monitoring mean that detection with certainty is rarely possible.

Poaching, too, occurs when there is a difference in incentives—that is, when the vendor can earn more by reusing and reselling expertise gained from the client, or even competing with the client, than it can otherwise. And, as is the case with shirking, poaching occurs when there is uncertainty in detection or precontractual uncertainty as to what actions might be possible and attractive for the vendor later on.

Holdup also requires an incentive difference between client and vendor. In this instance, it is easy to understand: The vendor wishes to charge more than originally required by the contract, while the client does not wish to pay more. There must also be some change in power that enables the vendor to demand and win this increase in payment. This often occurs by way of a phenomenon called postcontractual small numbers bargaining: Once a contract has begun, there are frequently few alternatives available to the client but to continue with the vendor that was originally selected. This lack of alternatives can occur for any of several reasons. The client may have made a sunk cost investment of some form, for example, such as buying hardware with limited resale or salvage value that works effectively only with software provided by the vendor. Alternatively, it may have transferred to the vendor ownership of critical assets, such as its data center hardware and legacy systems, or it may have divested internal staff and expertise, again making it dependent upon the vendor. Whatever the reasons, the bottom line is that the client loses power because it would suffer an intolerable loss of revenue or profits if the vendor's demands are not met.

Managing the Risks

When you outsource application development, any and all of the above risks are possible. Fortunately, there are a few simple guidelines that can substantially improve your chances of success:

1. Understand the project. Companies that choose to outsource applications must have a high degree of understanding of the project they are undertaking, including its requirements, the method of its implementation and the source of expected

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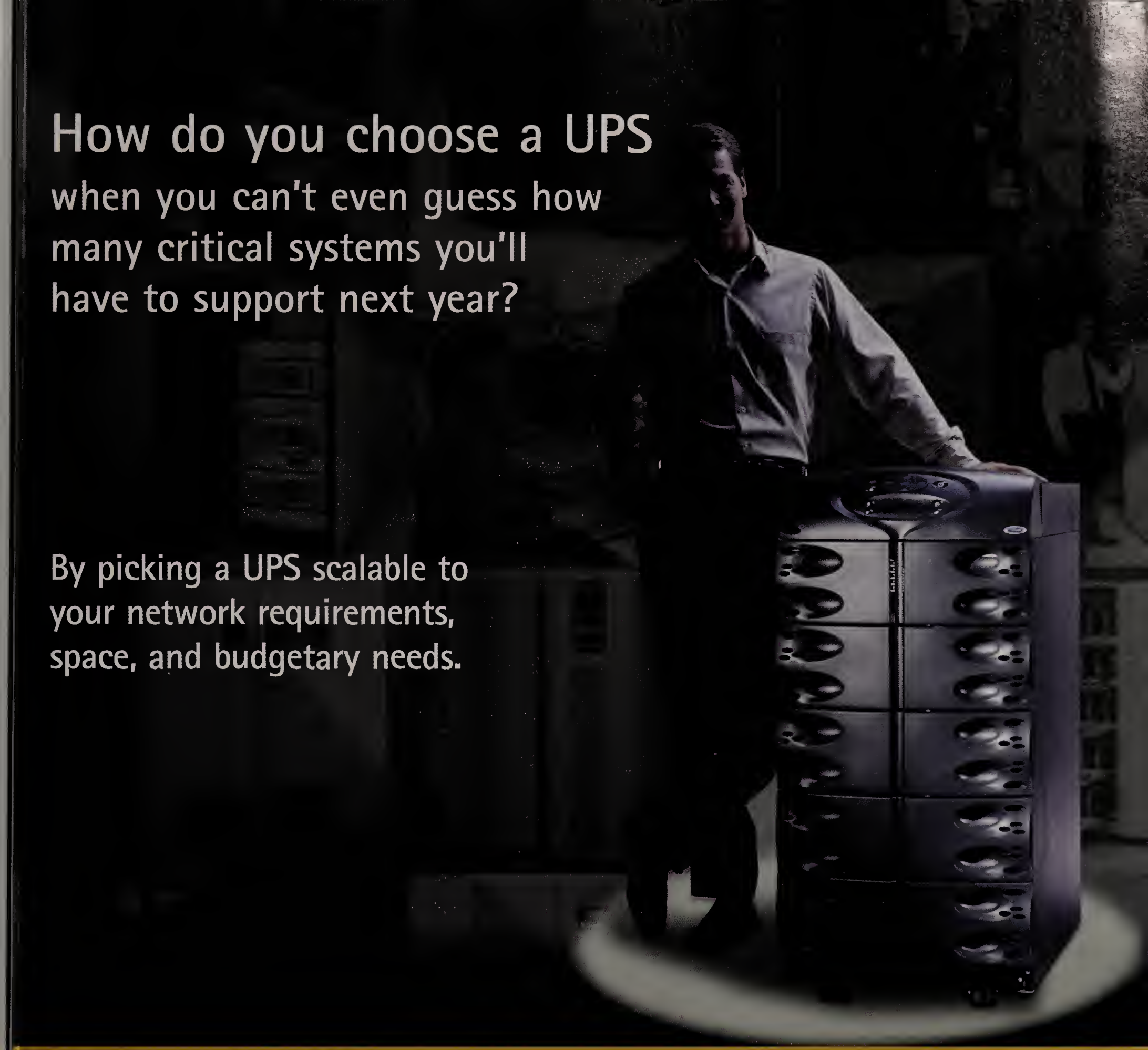

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economic benefits. This is crucial to providing reasonable incentives for meaningful measures of performance. On Wall Street, historically, attention and rewards have been given to those who produce profits, like successful trading desks; there has been less interest in managing cost centers like information processing. Despite the strategic importance of information infrastructure, many companies on the Street have attempted to squeeze systems, and they have failed to provide the resources or the guidance needed for long-term investment in IT. When they realized that they have not always done a good job managing this area or rewarding performance, some have outsourced with contracts obligating vendors to "do a better job"; however, this provides neither the metrics needed to define a better job nor the incentives for the vendor to steer in the desired direction. Understanding project objectives also helps to reduce the risks of poaching, since it is then possible to specify and control access to elements that may be critical to the client's future competitive positioning. The risks of outsourcing product distribution—as airlines did with computer reservation systems in the 1970s, for example—can clearly shift too much power to the distribution system. Using a third-party information processor to manage client relationships can allow another party to have access to your customer history and pick off your best accounts. The most successful projects we studied were those in which the client was fully capable of developing the application itself but chose to outsource simply because of constraints on time or staff availability.

A "law of the wallet" holds in software outsourcing: If you pay for lines of code, you will get many lines of code; if you pay for testing, you will get lengthy test logs.

2. Divide and conquer. Dividing a large project into smaller, more manageable pieces will greatly reduce programmatic risk. In principle, completion of each independent chunk creates the possibility that subsequent development work will be handed off to a different developer. Each chunk should have specific objectives and quality metrics, and each piece should be independent, in the sense that companies would have to absorb only tolerable increases in development costs should they choose to switch vendors after one or more chunks has been completed. Although this will increase development costs, it reduces or eliminates the risk of vendor holdup. If the vendor attempts to overcharge for continuation, the self-contained nature of the work completed to date will permit a more or less painless handoff to another vendor for continuation of development. Moreover, by assessing checkpoints at the completion of each chunk, the company can detect quality problems and reduce the risk of shirking or underperformance. Thus, when deciding on the milestones for such a project, it is important to have a viable exit strategy if any chunk fails.

3. Align incentives. Although the vendor's incentives can never be fully aligned with those of the client, it is frequently possible to design contractual incentives that will help enhance performance. If you pay a telephone interviewer for the number of calls he makes, they will be short; if you pay for the number of minutes he is on the phone, each call will be long; if you pay for applications approved, you will have lots of approvals, and if you pay for applications rejected, you will have lots of rejections. What you want to do is pay for incremental sales. Unfortunately, such incentives are not always guaranteed to work. It is difficult to define incremental sales or determine the basis of compensation for your call center operators. A similar "law of the wallet" holds in all software outsourcing, and it suggests that you get what you pay for: If you pay for lines of code, for example, you will get many lines of code; if you pay for testing, you will get lengthy test logs. Incentives can bring vendor behavior in line with a client's expectations, thereby improving performance, but they can also distort it, causing performance to drop. It depends on how well individual vendor activities can be measured and how accurately measurable and rewardable activities can be correlated with desired performance.

In short, for all its attractiveness, there are a number of potential costs and risks associated with outsourcing. The above guidelines can help keep those risks under control. One final tip: When in doubt, hiring an honorable and well-managed vendor with a reputation to preserve may be your best protection. CIO

Eric K. Clemons is professor of operations and information management at The Wharton School of the University of Pennsylvania. He has been a pioneer in the systematic study of the transformational impacts of information on the strategy and practice of business. His research and teaching interests include information economics and information-based strategies, e-commerce, outsourcing and online distribution channels. Additionally, Clemons is associate director of the school's new e-commerce MBA major and a member of the Wharton eBusiness Initiative Curriculum Oversight Committee. E-mail feedback to Executive Editor Derek Slater at *dslater@cio.com*.

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India

CIO Field Report

Bypassed by the industrial age, India has the opportunity and the ambition to be a major player in the information age. But first, the country has to tackle some vexing infrastructure and political challenges.

India Unbound

BY TOM FIELD

PHOTOGRAPHY BY JOHN CHIASSON AND NAMAS BHOJANI

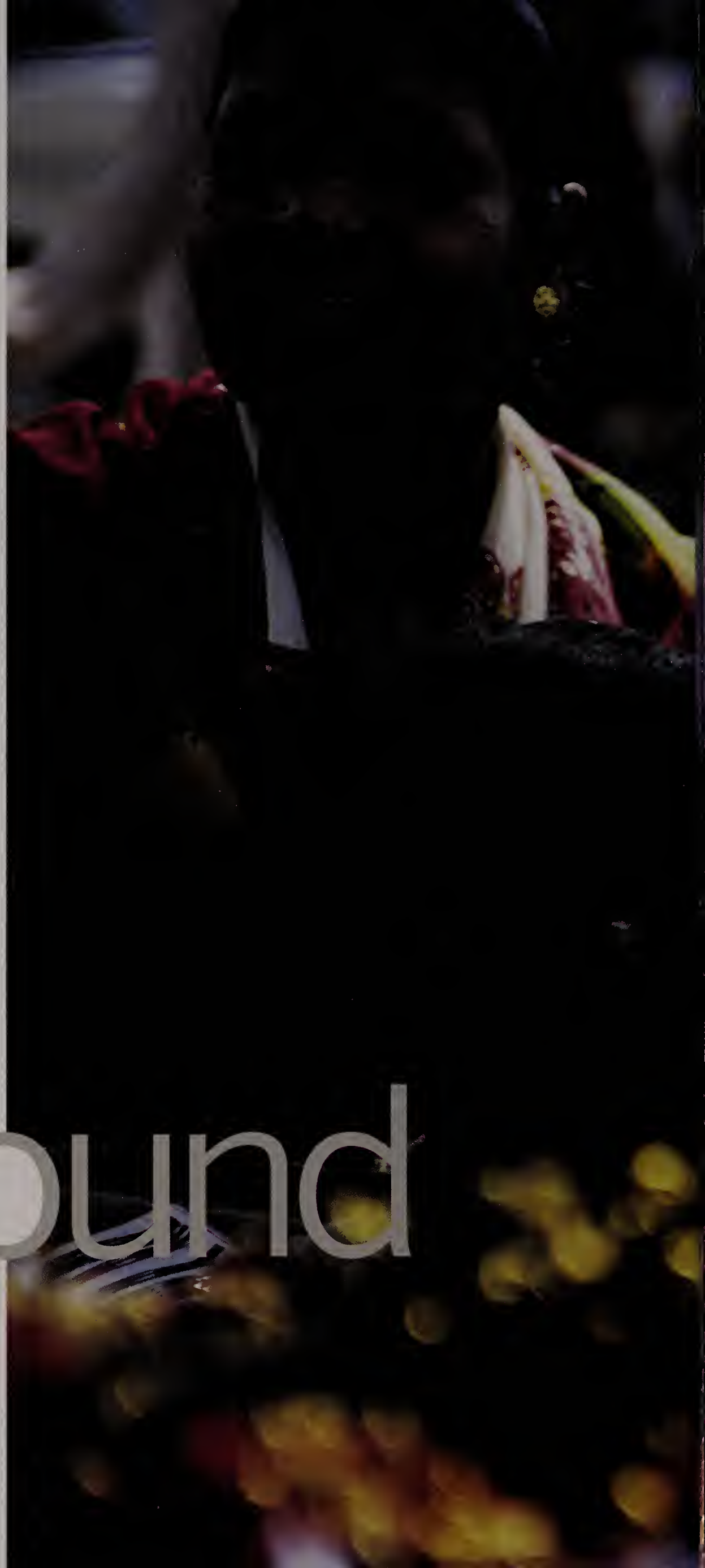

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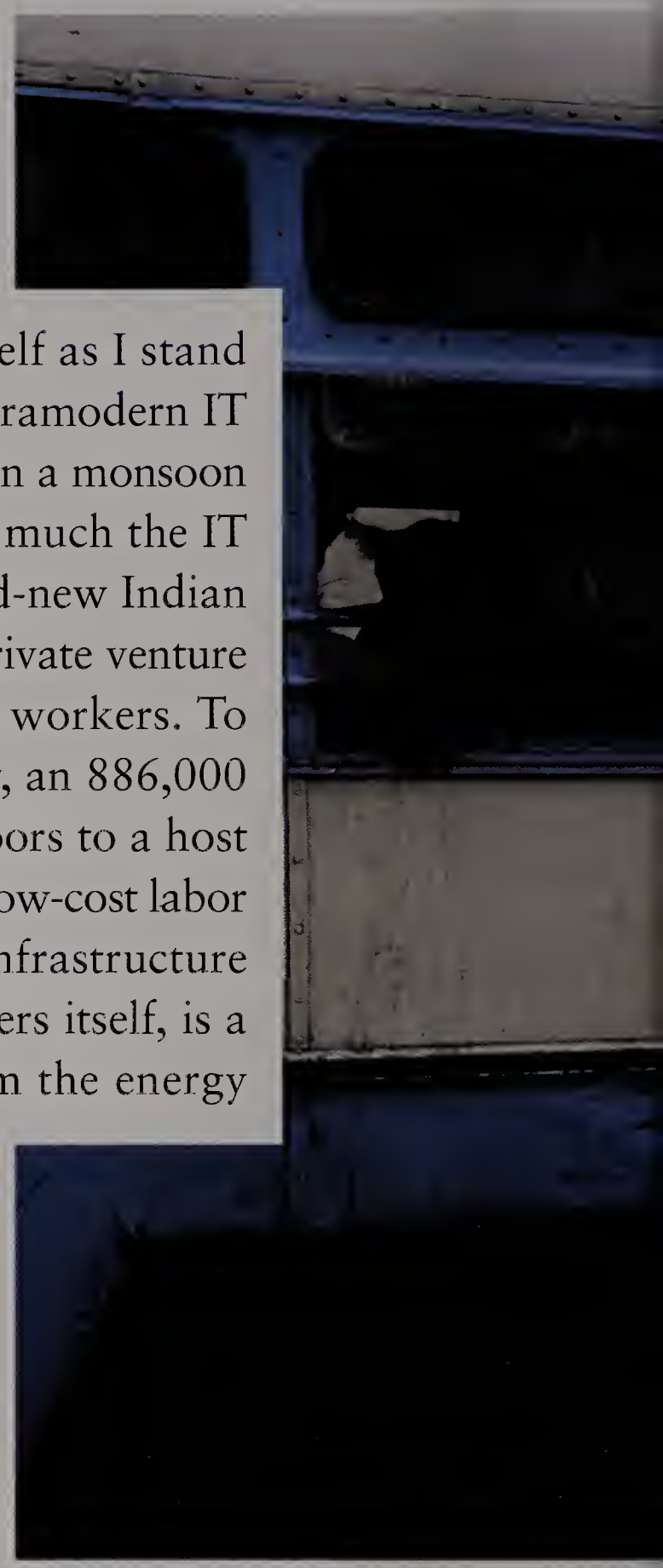
ILLUSTRATION BY ESTHER WATSON

On the Road

CIO Senior Editors Tom Field and Cheryl Bentsen traveled to five Indian IT hot spots in August and September. Amid poverty, sickness and the occasional riot, they met with leaders in IT, government and business who have high hopes for India's future as an information age powerhouse.



It's only been nine years. This is what I remind myself as I stand atop Cyber Towers in HITEC City, one of India's ultramodern IT office parks. Eleven stories high and fighting to stand in a monsoon wind, I survey greater Hyderabad and see just how much the IT industry has changed India. To my right is the brand-new Indian Institute of Information Technology (IIIT), a public/private venture tailor-made to train a new generation of knowledge workers. To my left is the still-under-construction Cyber Gateway, an 886,000 square foot office complex that will soon open its doors to a host of high-tech tenants eager to take advantage of India's low-cost labor and HITEC City's high-value telecommunications infrastructure and modern amenities. Below me, in the Cyber Towers itself, is a vibrant glass-and-steel complex already aglow from the energy of such big-name tenants as General Electric, Microsoft and Oracle.

Ten years ago, none of these things existed. There was no HITEC City, no IIIT and no Cyber Towers. It was only nine years ago that ex-Prime Minister P.V. Narasimha Rao's government initiated a series of reforms designed to open India's insular, insecure economy. By making it easier for the world to do business, India finally got its chance to stand and deliver in the global marketplace. The result is what one sees from the rooftop of Cyber Towers: a country absolutely transformed by the business of IT. Ten years ago, IT was a $150 million industry in India's largely agrarian economy—a piddling amount considering the country's population of 1 billion. Today, IT is a $5.7 billion industry in India, and it is projected to be an $8 billion industry by 2002—maybe $80 billion by 2010.

And yet, as I leave HITEC City, I ride over craggy roadways crammed with cars, motorbikes and cows. The belching auto emissions are so noxious, the honking horns so incessant, the roadside trash so imposing that my driver turns to me and says in broken English, "We have every kinds of pollutions here." We pass the sprawling shanty villages that house the hungry, stop in traffic and become fair game to the ragged beggars seeking rupees for food, and I think, "You have every kinds of poverty too." But again I remind myself: It's only been nine years. Even at Internet speed, age-old problems can't go away overnight.

India enchants visitors because it is—pardon the cliché—a country of contrasts. The splendor of the Taj Mahal in Agra is countered by the

FACT: From 1996 to 1999 the Indian software industry earned a total of $2.5 billion from Y2K-related products and services.

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The High Court of Karnataka in Bangalore

squalor of the shanty city in old Delhi. The beautiful rain forests outside Bangalore are startling in comparison to the thick-aired, traffic-clogged city itself. The brilliance of India's technologists, the huge global success of the IT industry, seem incongruous with the country's everyday realities of electrical outages and telephone failures. Pick a contrast (any contrast) and India probably has it. But the one that lured *CIO* to make India the focus of this year's special field report is this country's precarious balance between opportunity and challenge.

India can be an IT superpower. As the Indians themselves love to point out, they form the world's largest democracy, host the second-largest English-speaking population, and their math and engineering skills are world-class. In less than a decade this country hasn't just developed its own IT industry (fueled mainly by profits from software and services exports), but it's also exported significant brainpower to help lead ours. By focusing on creating a larger skilled workforce, attracting new foreign-owned employers to India and broadening the range of services its own companies provide to the world, India has the opportunity in the information age to be what it never quite was in the industrial age—a player.

FACT: In 1999-2000, 1,250 Indian companies exported software.

And, yet, how far and fast can the IT industry grow in a country where the lights and phone lines fail daily? How many knowledge workers can be created from a population with a more than 35 percent illiteracy

A Note About Names

You'll notice in the following stories that many of our Indian sources are identified by first initial and last name only, such as R. Ramanan, vice president of Tata Consultancy Services.This is a local custom practiced by individuals whose first names are so long they are difficult to pronounce and fit on business cards. Since these individuals identify themselves by first initial and last name—Mr. Ramanan, for instance, introduces himself as "Ramanan"—we have chosen to follow suit.

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rate? What social ramifications might there be if India's new IT wealth proves only to widen the gap between the country's haves and have-nots? These are among the vexing challenges that come hand in hand with India's bountiful opportunities.

For Cheryl Bentsen and myself, the two *CIO* writers who toured the country in August and September to prepare this special report, India presented a whole new set of opportunities and challenges. We were granted easy access to such IT leaders as Wipro Chairman Azim Premji—who as the country's wealthiest man and head of its biggest IT company is India's version of Bill Gates—and Andhra Pradesh Chief Minister N. Chandrababu Naidu, the country's renowned "laptop minister." But to get to these people and the many others we interviewed, we had to overcome not just clogged roads and cranky infrastructure, but earthquakes, floods, riots and sickness. You can read about some of our adventures in the travel dispatches we filed from India. Find these online at *www.cio.com/forums/global/edit/082100_letter1.html.*

For *CIO* readers, we believe India presents a compelling story. Perhaps you already know that India has become an easier place with which to do business, that the country has exported legions of IT workers to the United States and that it almost single-handedly built what we know today as the offshore outsourcing industry. But do you understand what challenges remain in trying to do business in India? Are you aware of how the nation's government, schools and private industry have banded together (unlike our own) to improve IT education? Have you seen the early results of India's Internet startups or the strategic plans of the outsourcing vendors whose futures depend on their ability to sell you higher-level services? These are among the topics we cover in this special report.

After you read this package and react to it, please send us your thoughts. But be sure to take time to reflect on what India has accomplished, what it has contributed to the world IT industry and how IT in turn has changed India.

And then remind yourself: It's only been nine years. CIO

Scenes from Bangalore: Shopping and a weekend cricket match

FACT: In the 1999-2000 domestic Indian market, ERP revenues grew by 23 percent; e-commerce software grew by 200 percent; CAD/CAM grew by 41 percent; and banking software grew by 70 percent.

Where will India be in another nine years? Share your thoughts with Senior Editors Tom Field (*tfield@cio.com*) and Cheryl Bentsen (*cbentsen@cio.com*).

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India

CIO Field Report: New Economy

DotKar

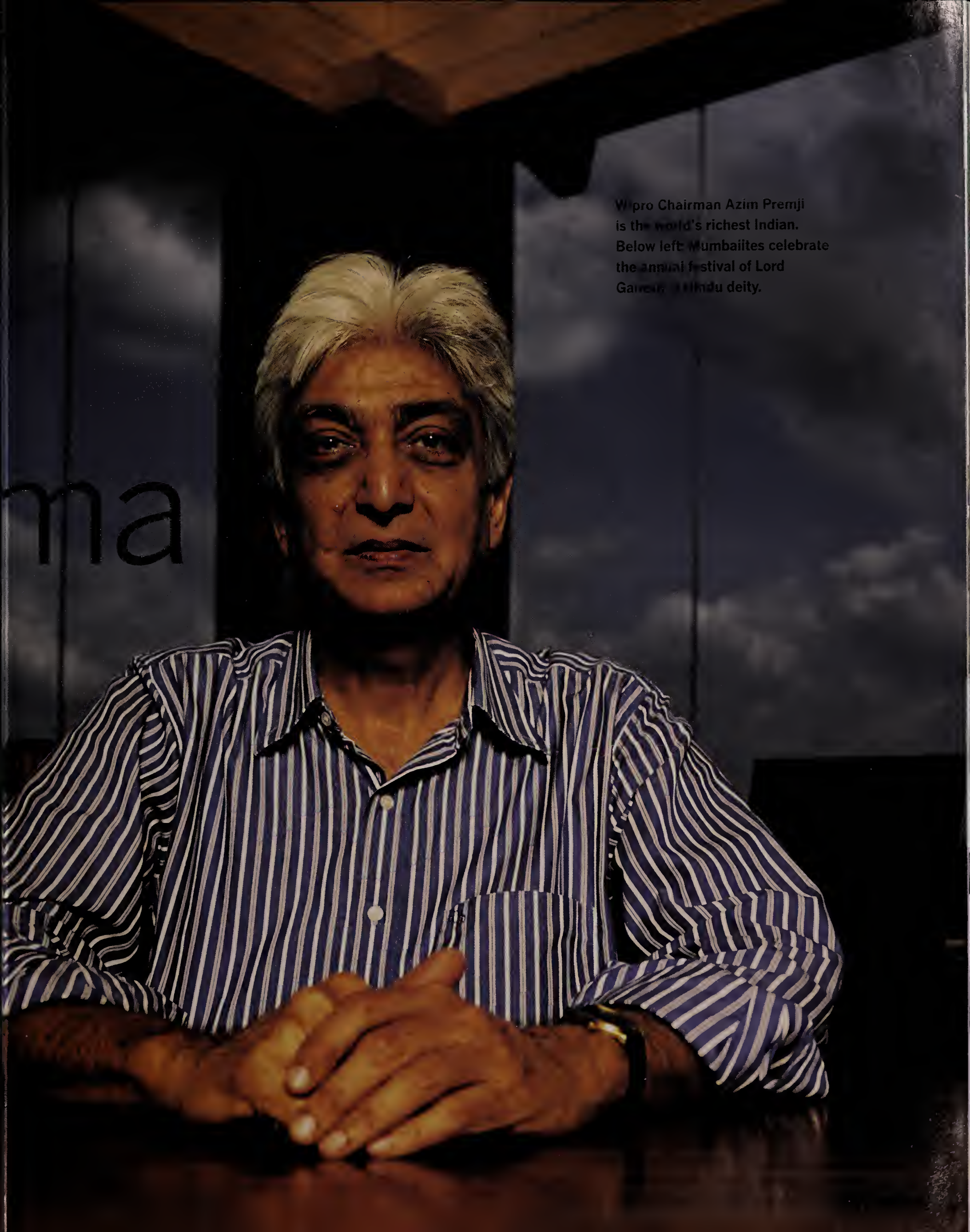
The future looks bright for India's new, IT-driven economy, but significant obstacles remain

BY CHERYL BENTSEN

In early September, Mumbaiites are in the midst of the annual 10-day celebration of Lord Ganesh, a half-human, elephant-headed Hindu deity, reputedly the harbinger of wisdom and success, a sort of national lucky charm.

The streets of Mumbai—or Bombay, as many English-speaking Indians still prefer to call the financial capital—are decked out with bright lights. Every stall hawks small Ganesh statues, which are considered auspicious gifts. A shopkeeper throws in the cheaper variety with the silver bracelet I buy. "It will bring you good fortune," he says.

PHOTOS BY JOHN CHIASSON



Wipro Chairman Azim Premji is the world's richest Indian. Below left: Mumbaiites celebrate the annual festival of Lord Ganesh, a Hindu deity.

The ROI is better in India than in Silicon Valley, says Wipro's Azim Premji.

PHOTO BY JOHN CHIASSON

Not necessarily so. In the early morning of Sept. 5, an earthquake hits, registering 5.5 on the Richter scale, jolting me out of a restless sleep on the 21st floor of the luxurious Oberoi Hotel. I resolve to stay in low-rises for the rest of my stay in India. More alarming, the monsoon has brought the heaviest rains in a century and caused hundreds of deaths. The newspapers describe bloated corpses and poisonous snakes; flood survivors wade through chest-high water in eastern India searching for lost relatives and valuables. The season also brought a new kind of suffering—a bitter dotcom shakeout and a battering of India's IT stocks riding Nasdaq's choppy wake.

But there's good news as well, especially for India's high-flying IT industry. In September, Goldman Sachs revised its projections for India upward, saying the country's IT industry will grow almost six times in the next five years. In addition, Internet use will grow four times faster than was earlier projected. Based on growth during the past year, previous estimates of 17 million Internet connections in India by 2003 have been jacked up to 70 million connections in the same period. The report also says India may corner 5 percent of an expected $585 billion in the global IT services market by 2004. That's up from 1.6 percent (or $5.7 billion). In 1998 fewer than half a dozen venture capital (VC) companies were in India; today there are more than 50. VC investments in India are expected to jump to $3 billion in the next 18 months, almost 10 times the $320 million that flowed into the country in 1999, according to the Indian Venture Capital Association.

> In 1998 there were fewer than half a dozen venture capital companies in India; today there are more than 50.

Both local and foreign investors are inspired by the Silicon Valley successes of Indians such as Sabeer Bhatia, 41, who three years ago sold Hotmail.com to Microsoft for more than $400 million; Gururaj "Desh" Deshpande, 49, cofounder of Sycamore Networks (Forbes listed him as being worth $3.9 billion); and Rajendra Singh, 46, cofounder of Teligent. Indeed, India's far-flung IT billionaires are among the most aggressive investors eyeing Indian startups.

"[Nonresident Indians] are now showing a lot of interest in India because they think there's a lot of money to be made," says Azim Premji, chairman of Wipro, the home-

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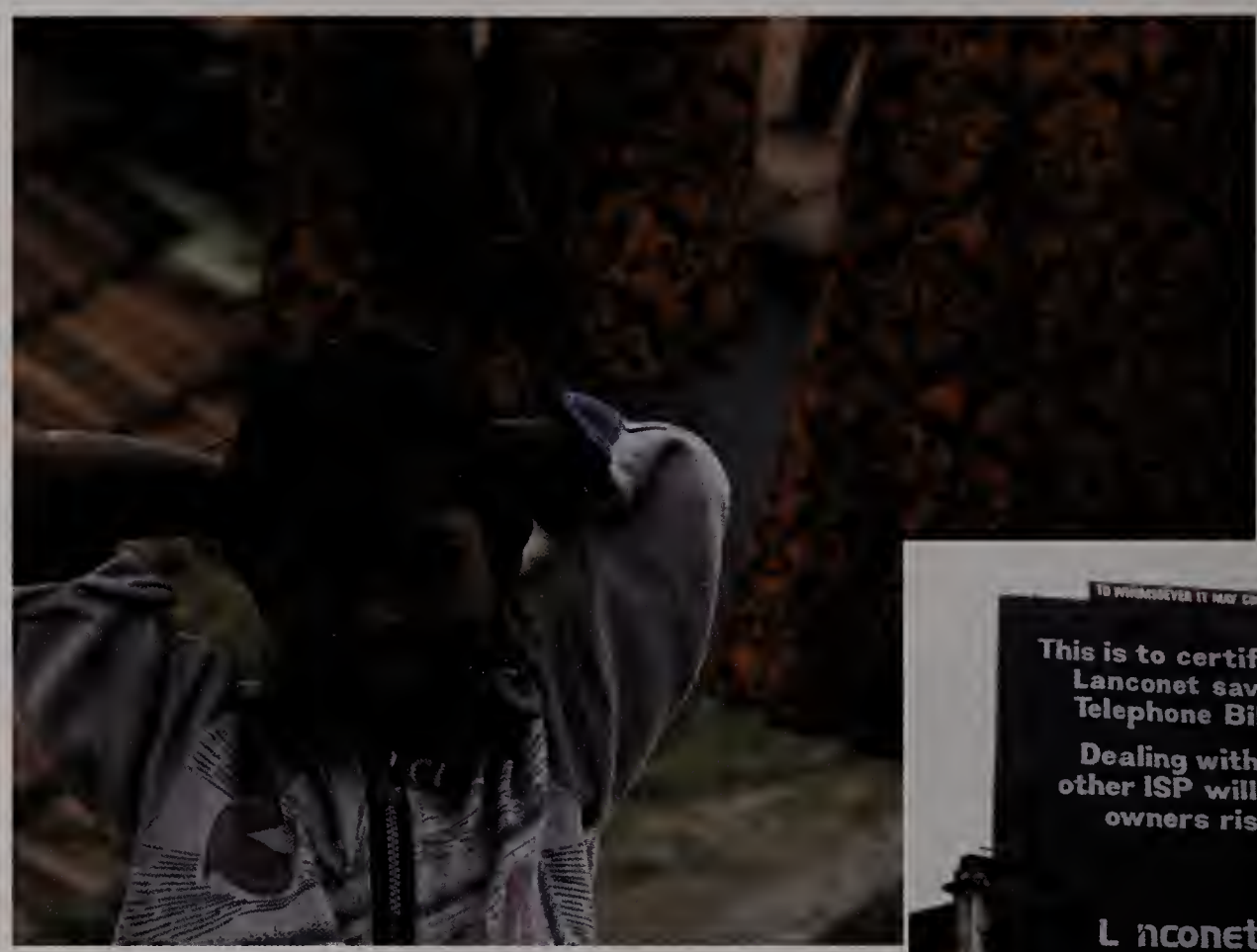
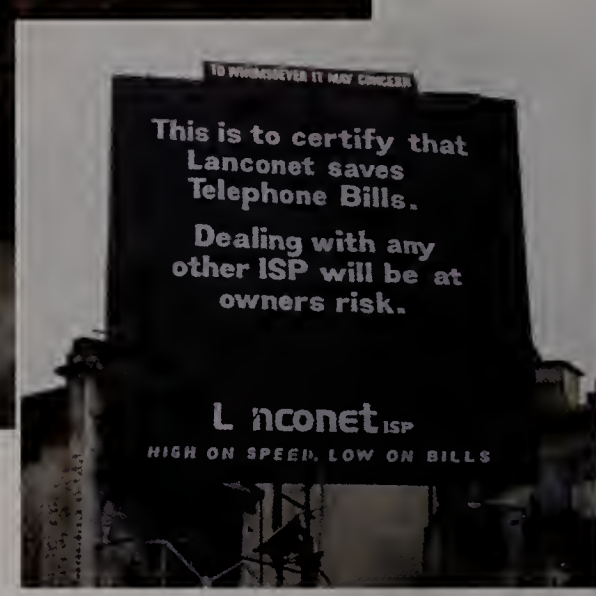
grown computer services and software giant. "They're suddenly finding that the quality of investment and the return on investment in India are better than the return on investments in Silicon Valley."

The numbers look good. India's software industry earned $5.7 billion last year, up from $50 million in 1991. Market capitalization, $4 billion in March 1999, rose to $104 billion in March 2000. With market fluctuations, it has dropped to around $65 billion. "But from $4 billion to $65 billion is not a joke," says Dewang Mehta, president of the National Association of Software and Service Companies, an industry lobbying group that represents some 700 Indian companies. Three Indian software companies are now listed on the Nasdaq exchange, and five are on the New York Stock Exchange. The IT industry employs 340,000 workers. India is producing 122,000 software engineering graduates every year with plans to double that figure to meet worldwide demand.

Traveling through India, I hear one phrase repeated many times—from writers, software engineers, movie producers, investment bankers, members of parliament, shopkeepers and even one crisply tailored hotel driver, who, steering his taxi through streams of mopeds, auto rickshaws, wobbly trucks, cars, cows and panting dogs in downtown Bangalore, glances in the rearview mirror and announces with pride, "It is our time, madam."





According to The World Bank, India leads the world in population growth at 16 million people each year. Right, a sign testifies to Bangalore's status as India's high-tech boomtown.

Rocky Path to the New Economy

The paradox is that while Indians rejoice over glowing projections of IT growth, India is one of the world's least-connected countries. Seventy-five percent of the population live in rural areas. Most Indians have no access to telephones or the Internet. Although telephone lines in India are expected to increase by 4 million to 6 million lines annually, as of March 2000, there were only 26 million fixed phone lines for India's 1 billion population. Of India's 600,000 villages, only 370,000 have phone lines. Cell phones, introduced in 1995, now have some 2.2 million subscribers. India has around 1 million Internet subscribers with an estimated 3.5 million users. By comparison, China has four times as many telephone lines and Internet users and 18 times as many mobile.

And for all its prowess in software, Indians have few computers. India has only 4.3 million PCs, half the number of PCs in New York City.

But Indians do own 80 million TVs. With 37 million cable TV installations, India ranks No. 2 in the world for cable connections. "We believe that in the next two or three years that if the Internet will penetrate more in this country, it will be more likely through cable TV than through PCs," Mehta says.

The problem, of course, is infrastructure. No Indian industry—old or new economy—is unaffected by India's crumbling infrastructure, its long legacy of poverty, corruption and a plodding socialist economy only recently dismantled.

Even Bangalore, a high-tech boomtown, endures frequent and annoying power outages. Most shops on the city's main drag—Mahatma Gandhi Road—rely on noisy,

PHOTOS BY JOHN CHIASSON

has its reasons.

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Morning rush hour in Mumbai.

polluting backup generators that sound like outboard motor engines to keep the lights on.

"We also suffer from a severe lack of telecom infrastructure," says Mehta. "The next big project is to increase bandwidth." Deregulation is expected to improve the infrastructure picture. Earlier this year the IT-minded government of Prime Minister Atal Behari Vajpayee opened up the domestic long-distance market to private operators and announced that Videsh Sanchar Nigam (VSNL), the state-run monopoly largely blamed for India's high international phone rates and bandwidth shortage, will be privatized two years ahead of schedule, in 2002. Private businesses were recently allowed to operate gateways but will rely on VSNL for bandwidth until new stations are in place.

India's frustrations and contradictions are nowhere more plain than in Mumbai, a city of great cosmopolitan charm, with ritzy hotels, modern office towers and miles upon miles of squalid shanties. Privacy seems of no concern. Slum dwellers let it all hang out, with lean-tos lining the roads in every direction, cobbled together with bamboo, cardboard and heavy plastic sheets with bricks, stones, old wheels—whatever is handy—holding down the roofs. Ragged dogs, some with deep gaping sores, slumber inches from traffic. Women scrub laundry on cement; barbers squat on their haunches before customers, dipping razors into cups of soapy dark water. There is a wondrous sociability about the whole enterprise. But the pollution burns my eyes; an acrid taste

Widespread Poverty

The scourge of poverty is one of India's biggest challenges. According to The World Bank, India has the highest concentration of poverty of any country, with more than a third of its one billion population living below the official poverty line. The gross national product per capita was $440 in 1999. India also leads the world in population growth at 16 million people each year. Bias against women and girls is reflected in the demographic ratio of 929 females for every 1,000 males. Female infanticide is partly to blame. Diseases such as leprosy, tuberculosis, cataract blindness and malaria continue to plague India. Two-thirds of polio cases reported worldwide in 1998 were there. It is estimated that 4 million to 5 million Indians are infected with HIV, and the number of new infections doubles every 14 months. Pollution is also a serious problem. India's cities are beset by environmental hazards, contaminated water, sanitation problems and population growth rates double that of the country as a whole.

A city of contrasts, Mumbai has both cosmopolitan charm and miles of slums.

PHOTOS BY JOHN CHIASSON

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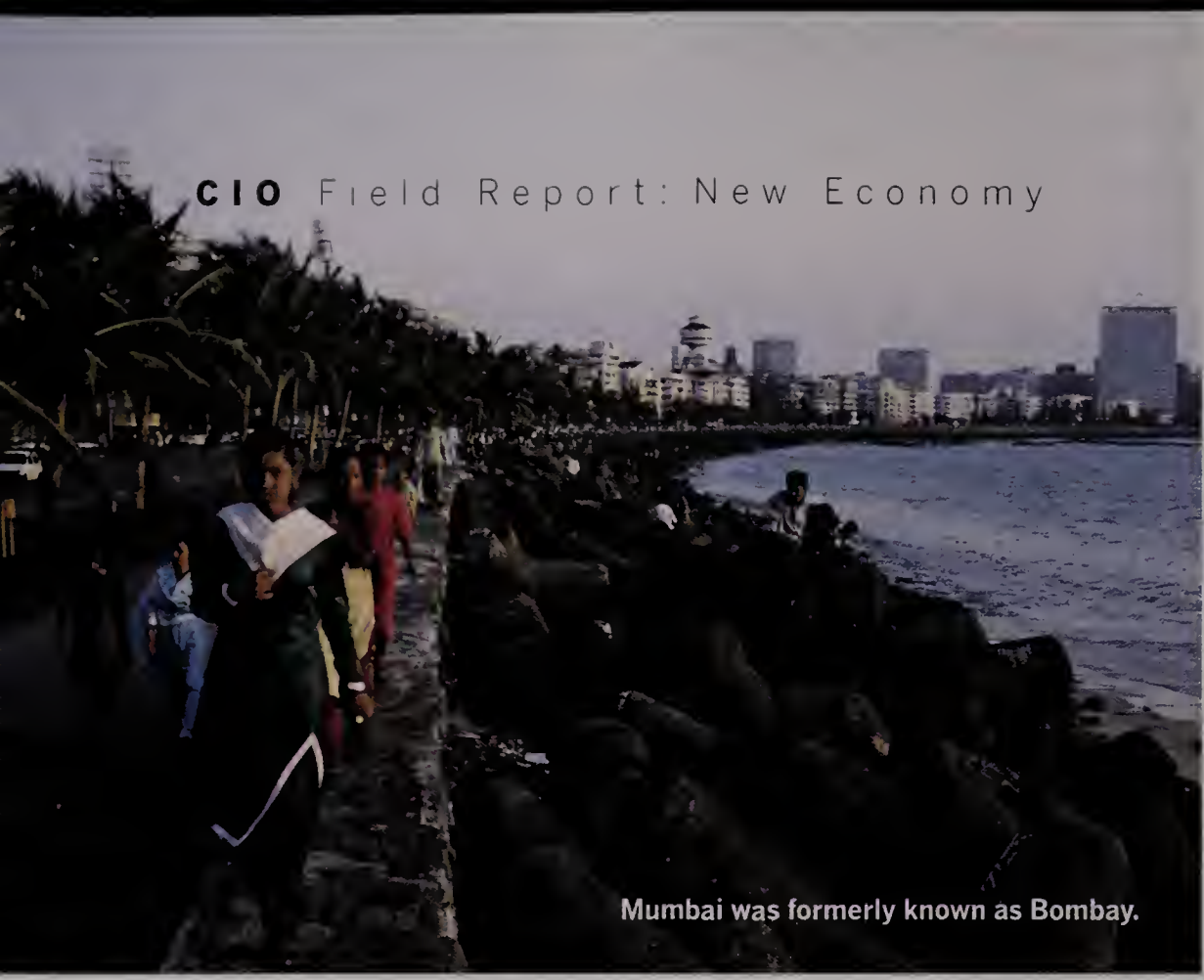

Mumbai was formerly known as Bombay.

India Lags Behind

Pyramid Research forecasts that four countries—Australia, Japan, South Korea and Taiwan—will account for nearly 80 percent of Asia's e-commerce in the next year. India, hobbled by its infrastructure, will account for just 4.3 percent of the total. Low credit card penetration and potential delivery problems are among the obstacles to e-commerce development. Only 46 percent of India's roadways are paved; the railways, ports and airports all require upgrades to meet international standards.

settles in my mouth. I look at the slums and think I would lose my mind living like this. Nonetheless, the women who live on the streets exude an elegant insouciance, brushing and plaiting each other's hair, sipping cardamom tea from rusted cups, chatting as if unaware of the petrol-belching traffic and gawkers like me on their doorsteps.

Traveling through Mumbai's traffic-clogged streets—it takes two hours to cover a few miles—I see this headline in the newspaper: "Earthquake Could Destroy Mumbai in 10 Seconds." The taxi driver points out with some apparent awe at life's surprises: a pile of rubble where a commercial building collapsed during the monsoon a few years ago. Many Indians were killed, though one resourceful woman buried in mud used her mobile phone to summon help.

This is a country where rail-thin barefoot men wearing only loin cloths construct modern office towers, where Indian women haul debris from a construction site in trays balanced on their heads. This is a country where land and caste continue to plot the fate of most Indians, where most regulations and building codes are fluid. When people talk about the benefits the Internet can bring to India, some see a way to beat corruption, allowing citizens to obtain certificates (a caste certificate, for example, that entitles the holder to apply for low-cost loans) and file applications for basic services like land transfer registration without having to bribe a clerk.

New websites in India are appearing at the rate of three per day, with the total estimated at around 23,000. Competition is almost impossibly fierce.

World's Richest Indian

Over the years, Wipro Chairman Azim Premji has waged what at times must have seemed a lonely battle against corruption. His company has withstood power outages and confiscation of import consignments for its refusal to bribe.

Everybody in Bangalore, all of India, it seems, takes pride in the success and humility of Premji, the world's richest Indian. He is described as a regular guy with simple tastes, a man who has been observed at the airport patiently waiting for a driver. (Imperious airs are not uncommon to Indians of high position.) With an estimated personal wealth of $6.9 billion, 54-year-old Premji tops *Forbes*' list of Indian billionaires, a distinction he finds mildly embarrassing: "It makes me feel like a zoo animal."

He attributes his reputation for integrity to his father's legacy. His father founded the vegetable oil company that Premji grew into a $47 million home-care and computer services conglomerate. Though he manages to stay above the near hysteria that surrounds hopes for the Internet and e-commerce, he is closely watching the burgeoning VC market in India. "The VCs are very aggressive, very hungry, going around like vultures," Premji says. "They make two calls a week to one person in the same company all the time—a tremendous source of distraction for people who are working on jobs. But I suppose they are generating opportunities for people."

VC in India is targeted at software development, services, companies that can sell to the West. But according to Merrill Lynch, local and foreign VCs have also invested more than $100 million in 800 Indian-based Internet companies in 2000. The current favorite is 3-year-old Rediff.com, which in June was the first portal site to go public on

PHOTO BY JOHN CHIASSON

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For the enterprise, this is a potential boon; Web-empowered customers are allowed to set their own schedules, use their own favorite medium to retrieve information, and use the Web to serve themselves, as well as deepen their relationships with businesses. Companies can even leverage existing databases and customer background, more effectively mining and deepening existing information.

Often taken for granted, the call center industry plays an important role in our economy. Some five percent of the nation's Gross Domestic Product transactions take place through call centers today, and almost five million workers are directly employed as call center agents.

Check out Solution Center during the next couple of months for upcoming stories on Managed E-mail and Network Management over the Web.

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Indian Prime Minister Atal Behari Vajpayee visited the White House in September.

Given the talent, the assurance of quality and the sheer determination of the Indians—all at low cost—it's no wonder that India is suddenly everybody's new best friend.

Nasdaq, raising over $60 million. Headed by a former advertising executive, 52-year-old Ajit Balakrishnan, Rediff's backers include General Electric, Citicorp and Intel, among others. Its model is Yahoo. Rediff offers online shopping, language editions, a search engine, news links, its own columnists, e-mail, chat, instant messaging and homepages.

Among the more aggressive newcomers is Indiainfo.com, which provides content in six local languages and is the first general portal to offer personalization. In the past year it acquired eight companies, and the staff grew to 350. Its founders are B.G. Mahesh, 33, a computer scientist with a master's degree from the University of Alabama, who put up one of the first Indian websites (Mahesh.com) in 1994; and Madhu Kodali, 36, who once ran an ISP in Flint, Mich. Last April, in Bangalore, they launched Indiainfo.com, backed by $16 million from 30-year-old U.S.-based Indian entrepreneur Raj Koneru, who built the $180 million IT services company Intelligroup. JM Morgan Stanley has bought a 7.5 percent stake in the company for $11.5 million. A third partner is V.S. Mani, 35, whose dial-in information service was acquired. A blitz of negative publicity followed the departure of some high-paid executives at odds with the founders. Rumors of a cash crunch were denied. Meanwhile, an IPO was put on hold. When I ask Kodali, recently named CEO, what he'd learned from the dotcom frenzy in the United States, he says, "The basic lesson for us is that you cannot go and acquire a customer at any cost. You need to be conservative. It's tough, but it's going to happen."

New websites in India are appearing at the rate of three per day, with the total estimated at around 23,000. Competition is almost impossibly fierce. "People will give a rosy picture of dotcoms in India, but success in this sector is way down the line," says E. Raghavan, editor of the Bangalore edition of *The Economic Times of India*. "If we find a way to do business on the Internet and eliminate processes in the middle, that will be great, but I'm not so sure about e-tailing. Indians are very touchy-feely; they like to shop and see what they're buying."

The brave remain undeterred. Last year McKinsey & Co. offered a mentoring program in which top VC and IT professionals would help budding entrepreneurs sharpen their business plans. Expecting 300 applicants, they were deluged with 4,000.

"Everyone senses this is a once-in-a-lifetime opportunity," says Ashok Soota, chairman and CEO of Bangalore-based MindTree Consulting. "What we are seeing is a revolution—and it's just the beginning. Hype? It's not hype at all, because there are past business comparisons to draw on and learn from. We know that in the long run it won't be cost that drives companies to India. It will be quality. Indian IT companies learned early on that strong processes and high quality would keep the world interested and provide repeat business. Cost is a big factor but not the deciding factor.

"A good analogy is the Japanese auto manufacturers' entrance into the U.S. market," Soota says. "At first, in the 1970s, the attraction was low cost and good gas mileage, but Toyota, Honda, Nissan and the others would not be the major players they are today without quality. They also knew that in the long run, quality would outlast cost, and they started building reliable, affordable cars. The biggest winners were the ones that realized that the combination of high quality and reasonable cost creates profitable growth and market dominance. The IT industry in India is being built exactly this way."

Given the talent, the assurance of quality and the sheer determination of the Indians—all at low cost—it's no wonder that India is suddenly everybody's new best friend.

The World Comes to India

Japanese Prime Minister Yoshiro Mori visited India in August (stopping in Bangalore before he visited New Delhi, the Indian capital), stressing his admiration for India's IT success

PHOTO BY PABLO BARTHOLOMEW/LIAISON AGENCY

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and soft-peddling Japan's concerns about India's nuclear technology. In September, while Indian Prime Minister Atal Behari Vajpayee and his entourage wined and dined at the White House, Bill Gates, Jack Welch and Michael Dell packed off to India to push product and make deals. In October, Russian President Vladimir Putin was in New Delhi, hoping, perhaps, to rekindle some of the warmth and amity that marked the countries' relations in the Soviet era.

The corporate titans received the fanfare normally accorded heads of state. In Bangalore, the road to Premji's house was given a special cleaning, as GE's Welch would be coming to dinner. Beggars and hooligans were rounded up. Hopes were high.

Michael Dell, above, CEO at Dell Computer, sees a chance to make money in India. Jack Welch, right, CEO of General Electric, touts the "sheer and raw talent" of Indians.

GE's business investment in India is more than $1 billion since India began to wean itself from socialism and loosened up its economy in 1991. GE's businesses in India include avionics, medical systems, call centers and investment banking. GE Capital, the world's largest nonbank finance company, set up its first India-based call center in 1997 with two employees and has since grown to a $30 million business, employing some 2,500 Indians who examine medical claims and car loan applications, and track down credit card defaulters several continents away.

Meeting businesspeople in New Delhi, Welch praised India's "intellectual capital" and "the sheer raw talent of Indians." He announced that GE would invest about $100 million during the next three years to build its largest research center in the world in Bangalore. The center will employ 2,600 scientists and engineers and focus on advanced chemistry, polymer science, mechanical engineering, ceramics, metallurgy and e-business. The company may also expand its financial services business and is examining the recent opening of India's insurance sector.

"This is the most fertile place for research...and you get quality," Welch told a business group. "The fact that it is a low-cost country is all the more appealing."

But Welch warned that without a drastic upgrade in infrastructure, including a massive increase in electrical generating capacity "to realize its dreams," India will "miss the next revolution without the power to drive it."

India's power capacity is estimated at about 20 percent below its needs, with another third lost in transmission and through theft. The government needs a $250 billion investment over the next 10 years to double capacity, with at least two-thirds of that from the private sector. That will mean further cutbacks in popular subsidies and higher electric bills for consumers. Last summer, electricity cost hikes in the reform-minded southern state of Andhra Pradesh resulted in riots and four deaths.

A Work in Progress

Before India truly establishes a new economy, much work remains to be done to stamp out endemic corruption, update the banking sector and establish a legal framework for Internet transactions. (B2B is in a nascent state, while B2C is still negligible.)

In its most recent corruption perceptions index, Transparency International listed India as tied with the Philippines for 69th among the worst out of 100 listed countries. In New Delhi, Central Vigilance Commissioner (CVC) N. Vittal has turned to IT to fight corruption. Posted on the CVC website (*www.cvc.nic.in*) are the names of more than 100 civil servants against whom the commission has sought criminal departmental proceedings for major penalties. The roll of dishonor was, as one magazine called it, "a psychological assault that left civil servants dazed."

In this climate of change and uncertainty, the foreign banks—with the exception of Citibank—are holding back, waiting to see if promised reforms take root. Citibank, with some 10,000 account holders, has spent nearly $10 million on 28 ATMs, debit card terminals and other setups for Internet and phone banking in Bangalore, with plans to expand to other cities. But work is currently underway to upgrade the country's central banking system to put it in line with

PHOTO LEFT BY ALEX WONG/NEWSMAKERS. PHOTO RIGHT BY STAN GODLEWSKI/LIAISON AGENCY

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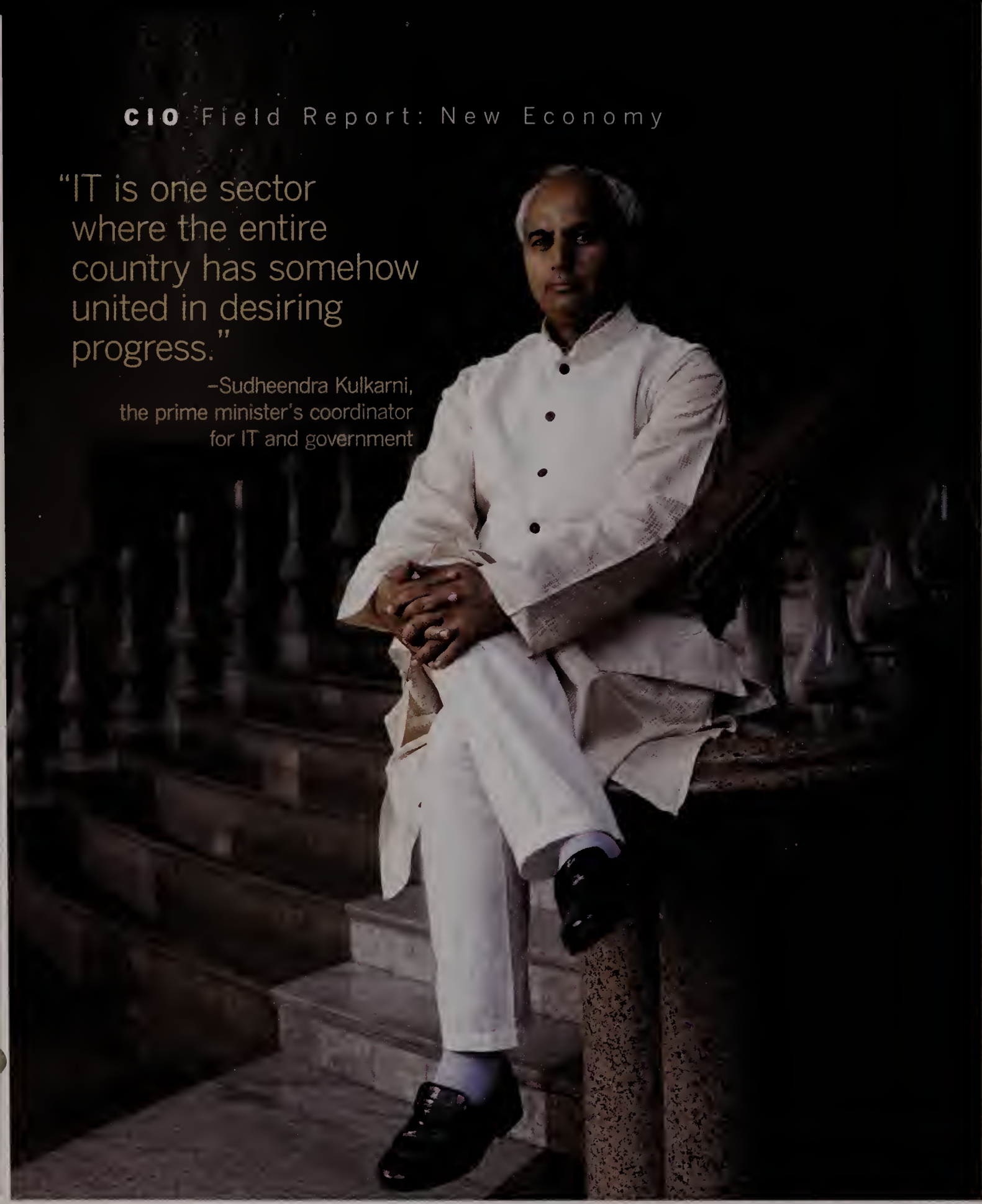

"IT is one sector where the entire country has somehow united in desiring progress."

–Sudheendra Kulkarni, the prime minister's coordinator for IT and government

PHOTO BY NAMAS BHOJANI

global standards (see "Counting on the Future," Page 118).

Thanks partly to IT, India's gross domestic product is predicted to grow at least 6 percent per year, nearly double the average annual growth of the European Union and far ahead of many Asian nations. In Ban-galore and Hyderabad, a Western-style middle class is growing, and this new class (including a growing number of millionaires) is moving into luxury gated complexes and building large villas on the outskirts of a once sleepy pensioners' paradise.

But what of India's poor, who lack not only phones, credit cards, computers and Internet connections, but also safe drinking water and, quite often, enough to eat? Is the IT revolution passing them by? Not entirely. Increasingly, villagers are finding ways to improve their lives with the Internet. Indian farmers use the Internet through low-cost public kiosks to check market prices and make decisions on where to haul and sell their produce. Farmers in some 20 villages in Madya Pradesh use e-mail to order fertilizer, contact officials and make arrangements with milk distributors. Through the Internet, schools in remote areas gain access to the world's great libraries.

Indian villagers are also using the Internet to register complaints. A trip to the village cyberkiosk and a payment of a few rupees is all it takes to report a broken water pump. Last year schoolteachers in Anandkhedi and Umrela, obscure hamlets, were not paid for five months. An e-mail complaint uncovered an accounting error, and the funds were dispatched.

This, then, might be the real potential of India's new economy and the role of IT: empowerment to the people. "IT is one sector where the entire country has somehow united in desiring progress," says Sudheendra Kulkarni, the prime minister's coordinator for IT and government. "There are no divisive positions in IT. In Hyderabad you saw riots over the power reforms. But in IT there has been no resistance because everyone feels this is the future for India. We're noticing that the people succeeding in IT are first-generation entrepreneurs, making it on talent and hard work. Today the son or daughter of a small clerk in an office or even a farmer who is minimally exposed to what is happening around the world would like to have computer education, would like to be part of this revolution. A nation moves when all the people desire movement. It has become a part of our aspiration." CIO

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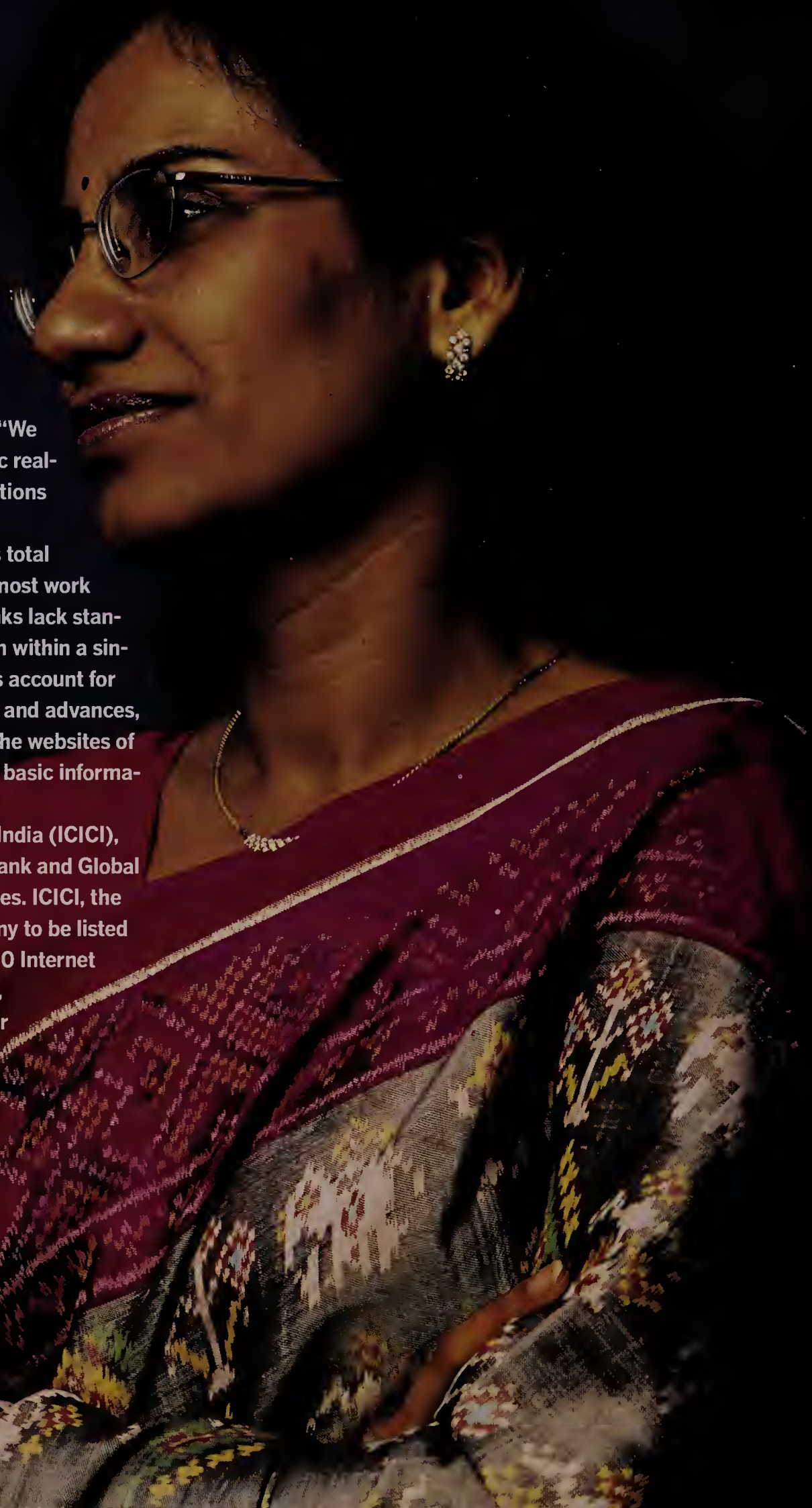
Counting on the Future

India drags its banking industry into the 21st century

Before India can become a global economic powerhouse, the country's banking industry has to make vast improvements in its operations and systems. S.R. Mittal, IT chief general secretary manager for the Reserve Bank of India (RBI), describes the "gigantic task" of bringing the central bank in line with international practices. Mittal's priorities are to upgrade the communications infrastructure, establish a generic computer architecture and standardize products. He concedes that public expectations are moving faster than the bank: "We don't want to go out of alignment with the basic realities. If we don't have a well-tested communications network, we will fail."

The RBI handles 80 percent of the country's total check-clearing volume in 940 centers, where most work is done manually. But India's public-sector banks lack standardized computer and software systems, often within a single bank. Even in urban areas, where 100 cities account for 62 percent of deposits and 70 percent of loans and advances, networking and connectivity are a challenge. The websites of most public-sector banks offer little more than basic information on services.

The Industrial Credit & Investment Corp. of India (ICICI), the Housing Development Finance Corp., Citibank and Global Trust are the first banks to offer Internet services. ICICI, the first Internet bank—and the first Indian company to be listed on the New York Stock Exchange—has 250,000 Internet banking customers (out of a total of 600,000), according to Chanda Kochhar, general manager of the e-commerce division. "India is passing through a similar phase as occurred in the West over the last 18 months, when a large number of Internet companies folded operations. For us the question is not whether the base of Internet users will grow to 11 million users by 2002 as Nasscom predicts, but what the likely user base will be in 2010," says Kochhar.



Chanda Kochhar, general manager of the e-commerce division at ICICI, India's first Internet bank.

PHOTO BY JOHN CHASSIN

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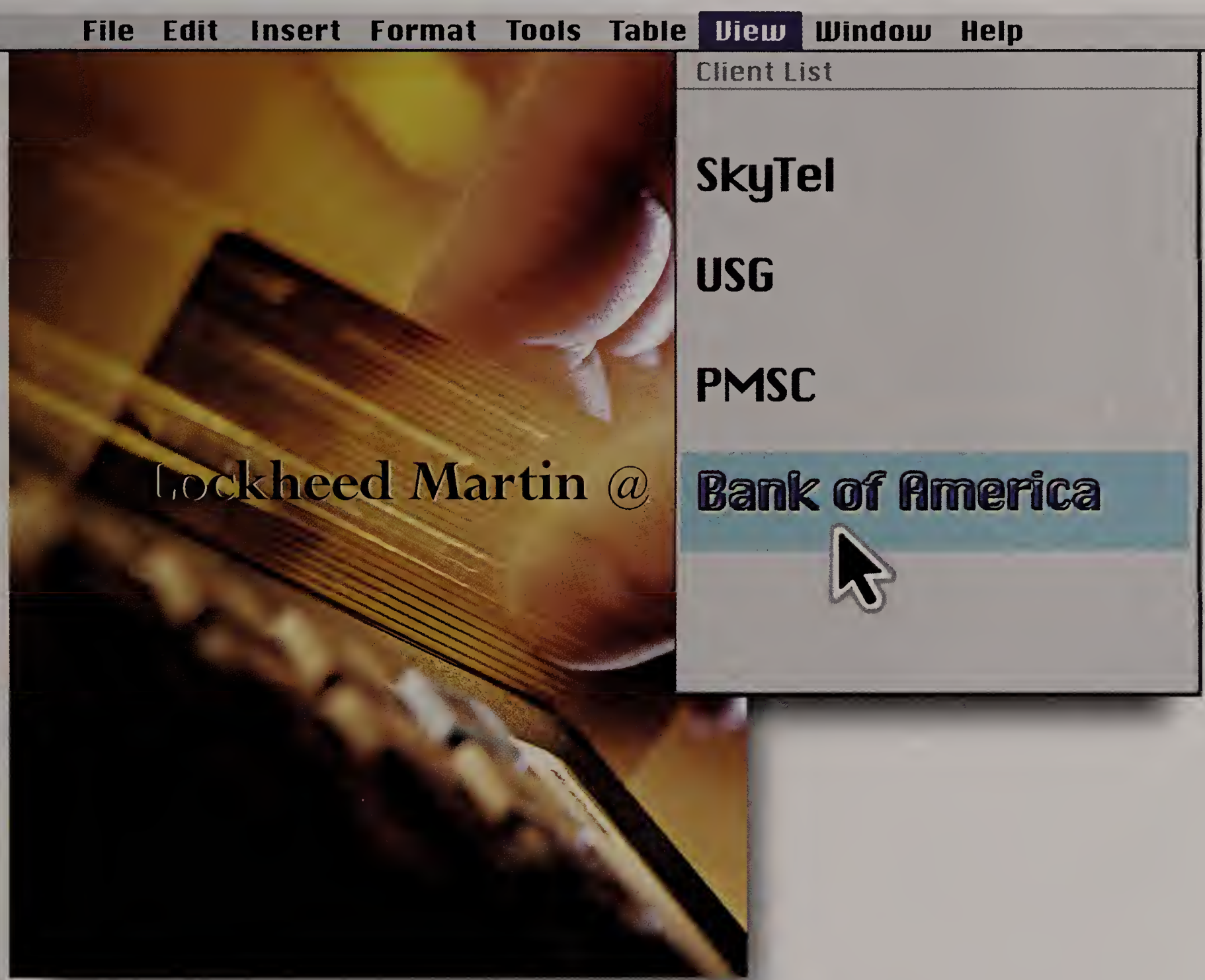

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Mehta in the Middle

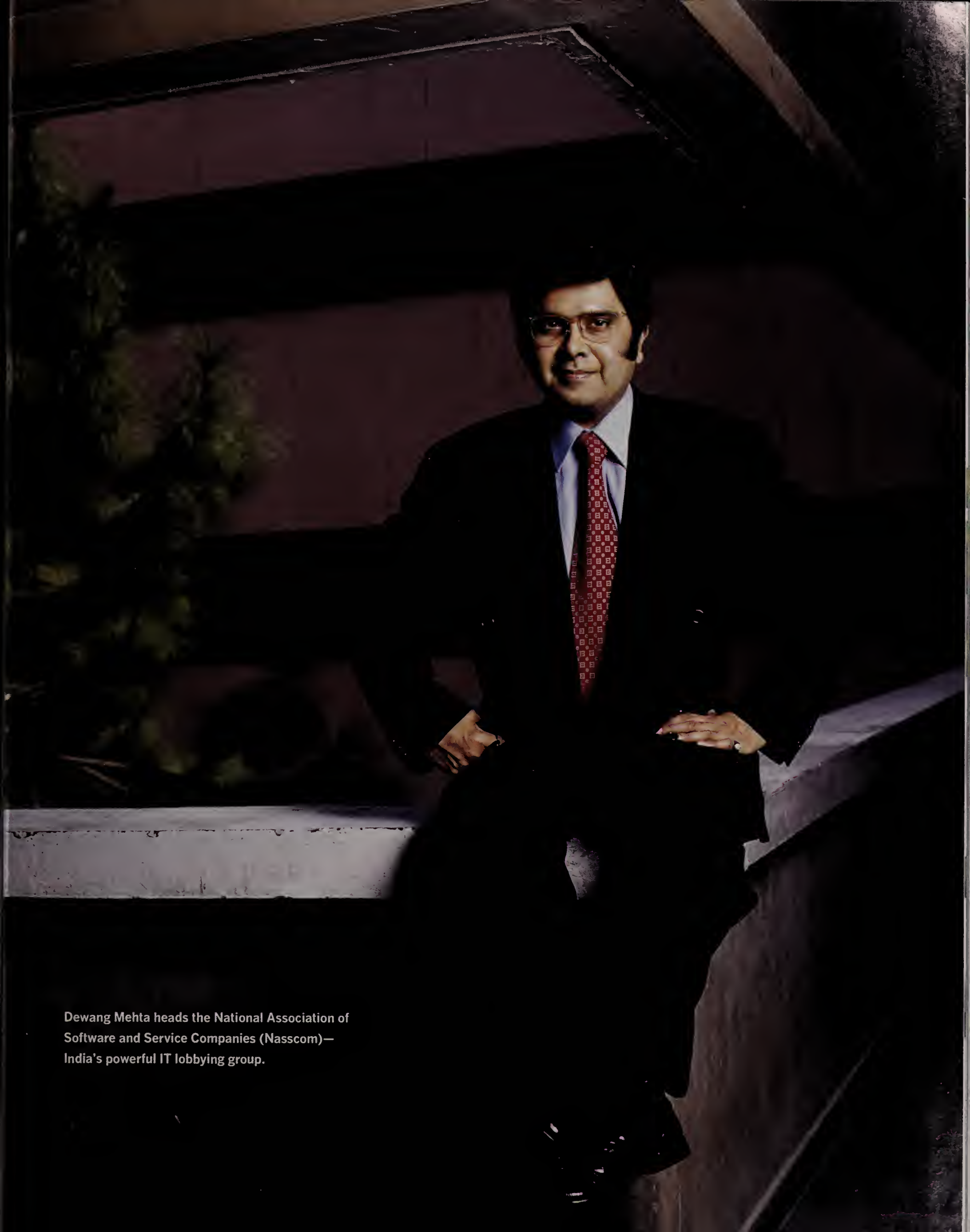
If you want to know the Indian software industry, you need to know Dewang Mehta

BY CHERYL BENTSEN

As familiar to TV viewers for his beatific smile as for his Elvis-style pompadour, Dewang Mehta, 38, is India's first IT celebrity. A shrewd lobbyist and irrepressible cheerleader, he heads the National Association of Software and Service Companies (Nasscom), which represents some 700 Indian companies. In a decade, the nonprofit group has become the single voice of India's IT sector, guiding the government, sponsoring seminars and conferences, and churning out rosy forecasts for Indian technologists.

"Ten years ago it was difficult to make the politicians and the common man understand that IT was the future of the country," Mehta says, commanding a massive blond desk of the sleek variety found in an Ikea catalog. Behind him is a wall of bookcases displaying his awards and citations ("IT Man of the Year," "Software Evangelist of the Year"),

PHOTOGRAPHY BY NAMAS BHOJANI



Dewang Mehta heads the National Association of Software and Service Companies (Nasscom)—India's powerful IT lobbying group.

books by John F. Kennedy (*Let the Word Go Forth*) and Howard Gardner (*Leading Minds*), the Starr Report, a Bill Gates biography, and a volume titled *Yoga and Meditation* abutting a Windows 98 software package. A portrait of the late guru Shirdi Sai Baba, of whom Mehta is a devoted follower, hangs on the wall. The Hindu holy book, the *Bhagavad Gita*, occupies a corner of the desk.

Trained in accounting and graphic arts, Mehta runs a computer graphics business in London (where he once worked as a fast-food cook at Wimpy's), but these days he's kept busy at Nasscom's offices, located in a posh New Delhi neighborhood with broad tree-lined avenues, five-star hotels and British-built bungalows that house diplomats, not far from the residences of Prime Minister Shri Atal Bihari Vajpayee and Congress Party Leader Sonia Gandhi.

Frequently pictured in the newspapers, smiling, shaking hands with Gates, Jack Welch or Michael Dell, Mehta hosts two weekend TV shows that cover IT news. His dream, he says, is to write and produce movies. Recently profiled in *Femina*, India's top women's magazine—he was photographed in a tux officiating a beauty contest—he revealed to readers his deep desire to "fall in love." Hundreds of hopeful women wrote in response.

"It seems romance has passed me by," he says wistfully, later acknowledging with a laugh that India's IT mission is, in fact, his burning passion.

"What the IT industry has done for India is give it a new sense of pride," he says. "We have proved to ourselves and to the world that we are very good in IT." There is no doubt of that. According to Mehta, a third of Silicon Valley startups last year were created by people of Indian origin. Today, 23 percent of Microsoft's workforce has ties to India; Intel has 21 percent; IBM has 19 percent; and Oracle has 18 percent. Of the 11 Indians on the *Forbes*' World's Richest People list this year, the wealthiest, Azim Premji, chairman of Wipro, made his fortune in IT (for more on Premji, see "DotKarma," Page 100).

However, Mehta sees more to IT than the minting of new billionaires—he believes that IT can help the poor and eradicate illiteracy in India. "We have 37 million cable television sets and only 3.8 million PCs in this country," he told *Femina*. "All we have to do is hook them up on to the Net. Once that happens, all the villagers have to do is sit in front of their television sets and learn."

It's still a tough challenge. The World Bank's latest country ranking on equality of educational opportunity put India at the bottom with Afghanistan, Algeria, Mali, Pakistan and Tunisia. In the last decade, India's literacy rate has increased from 52 percent to 64 percent. Yet more than half of Indian women are illiterate; about 40 million primary school-age children are not in school. Most of them are girls and from the poorest and lower caste households. Child labor is a continuing problem, as is widespread teacher absenteeism. And Mehta's proposed remedy of upgrading the current cable TV network to enable two-way transfers for Internet access could be expensive.

Mehta believes that IT can help the poor and eradicate illiteracy in India.

But Mehta does not skimp on ideas. He recently negotiated a joint venture between MIT and the Indian government—Media Lab India Project—that will work as a development center for regional language software and low-cost technology projects, with Microsoft, Infosys Technologies and Wipro (the latter two are both Indian-based companies) providing technical assistance. "The focus will be work that will help poor people of the country and the world," he says. "Plus, we will be doing a lot of research in video communications and media. Did you know that India has the largest movie industry in the world? (See "Don't Call It Bollywood," Page 190.) With the potential in IT, there is a lot of research that needs to be done to facilitate better moviemaking."

That's right—an IT project that would help the world's poor and the movie industry! Who could ask for more? CIO

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Ten things you need to know about doing business in India

BY TOM FIELD

Business Plan

Just 10 years ago, if a U.S.-based company such as Microsoft wanted to sell a simple software package in India, the poor customer had to pay not just the retail price, but also an additional 114 percent import duty. Such was the price Indians paid for trying to do business with the world—and vice versa. So fearful that foreign enterprises would sweep across India's

ILLUSTRATION BY ESTHER WATSON

E.P.W.

borders and wipe out native merchants, the insular central government had erected a barrier of duties, tariffs and regulations so restrictive that they might as well have hung a "Closed for business" sign on India's front door.

But times have changed. Beginning in 1991, former Prime Minister Narasimha Rao (who, to be fair, was pressured by the International Monetary Fund and The World Bank, which threatened sanctions if India didn't loosen up) introduced a series of economic reforms to encourage freer world trade. Import duties were slashed (today the Indian customer pays no duties on imported software), and licensing processes were streamlined to actually encourage foreign companies to do business in India. In 1992, the Indian rupee became a convertible currency. Since then, even some long-protected industries such as power generation and telecommunications have at least begun to be deregulated and privatized.

Today, India is awash in foreign investment. Literally scores of U.S.-based companies have set up shop to produce or sell goods in India. The business opportunities are clear: With 1 billion people (and counting), India is a great resource for foreign companies seeking cheap labor and eager consumers.

Yet balancing these opportunities, several significant challenges remain for foreign companies wanting to do business in India. How do you maintain business continuity when India's poor infrastructure can't even support reliable power supply and telephone lines? How do Western businesspeople learn to navigate India's chaotic cities and cope with local social norms? These are just two of the obvious issues. Clearly, whether selling goods, setting up a satellite office, transplanting employees or hiring native workers, foreign business leaders encounter a daunting series of political, economic and cultural hurdles that can impede—if not halt—operations. To minimize the gotchas, we've boiled down our research and resources and developed a list of 10 tips for successfully doing business in India.

Foreign-owned shipping companies, airlines and banks are permitted to open branch offices only on a reciprocal basis (their governments must allow India to open similar operations in the parent companies' country).

1. Understand That Open Doors Don't Mean Free Rein

Yes, India's central government has made it easier for foreign companies to do business in India, but there are still some significant catches:

- Foreign companies opening branch offices are not allowed to earn income (above basic operating costs) in India, and their expenses must be paid exclusively from funds received from the parent company. Any profits made by a foreign company in India must therefore be funneled back into the Indian-based enterprise. This might seem elementary, but the Indian government is quite explicit that it will not subsidize foreign companies doing business in India. Even visiting businesspeople are forced to produce documentation that their parent companies will assume their expenses while in India.

- Foreign-owned shipping companies, airlines and banks are permitted to open branch offices only on a reciprocal basis (their governments must allow India to open similar operations in the parent companies' country).

- Foreign acquisition of Indian companies is subject to regulation and approval by the Reserve Bank of India, the country's central bank, which shows favoritism to companies controlled by nonresident Indians.

For more information on business do's and don'ts, see the Indian Investment Centre's "Highlights of India's Economic Policies" homepage at *iic.nic.in/vsiic/iic3_a.htm.*

Fold Out
Here

* * *

Jason

2. Also Know That Big Businesses Can Get Big Breaks

Size definitely counts—especially if you employ significant numbers of IS workers. So eager is India to grow its IT industry that the central government and individual states have created lucrative incentive packages to lure big businesses to set up shop there.

At the national level, the central government has established 13 software technology parks (STPs) designed to promote software exports and IT training. Located in such far-flung cities as Calcutta, Kanpur and Pune, these STPs combine Indian- and foreign-owned software companies in regulated developments that include reliable infrastructure, duty-free zones and special income tax breaks for member companies.

At the state level, in Karnataka, home state of Bangalore (which bills itself as the Silicon Valley of India), new (not just foreign) companies that employ a minimum of 250 native IT workers are eligible for discounted or even free land for building office space. They also qualify for scalable breaks in registrations charges, zoning regulations and tariffs. In Hyderabad, capital of the central state of Andhra Pradesh, a similar incentive package offers zoning and sales tax exemption, a 25 percent break in power tariffs and nearly a $450 land-purchase rebate for every new job created. Hyderabad also has given telecom companies free rights of way to lay fiber-optic cables throughout the state. Says J. Satyanarayana, the state IT secretary (essentially the CIO who oversees state IT initiatives), "We get out of the way of industry."

For more information about special incentives for businesses in Karnataka and Andhra Pradesh, see *www.bangaloreit.com* and *www.ap-it.com*. And see *www.nasscom.org* for more on the STPs.

> If importing products to be sold, it's best to at least attempt to clear hurdles up front by contacting India's Central Board of Excise and Customs at *www.cbec.gov.in*.

3. Beware Customs Agents Assessing Duties

OK, so the Indian consumer no longer pays a 114 percent duty on imported software, and cumbersome customs regulations generally have been loosened. But foreign businesspeople still are frequently unable to slip past customs without paying huge duties on products being brought into the country—even if they aren't for sale. Example: When *CIO* magazine shipped over some boxes of logo merchandise to be given away to Indian CIOs, customs demanded more than $1,000 in duties. These items had no commercial value, but because they had been assessed at roughly $1,000 for insurance purposes, customs demanded that amount in duties. No arguments dissuaded customs officials, and ultimately the items were abandoned. This case seems more the rule than the exception, and businesspeople bearing gifts are urged to forget about "for insurance purposes only" and declare their items of no commercial value. If importing products to be sold, it's best to at least attempt to clear hurdles up front by contacting India's Central Board of Excise and Customs at *www.cbec.gov.in*.

4. Infrastructure: You Can't Live With It...but You Can Get Around It

No place in India is immune from the daily power outages, unreliable phone lines, tainted water and poor roadways that plague the nation. The best one can hope for are tolerably short outages—and yet no outage is tolerable to a business that relies on 100 percent uptime. To get around infrastructure issues, most major Indian companies have installed backup generators and either leased private phone lines from the central government or invested in satellite communications links. Even so, infrastructure issues occupy an annoyingly significant part of an Indian CIO's time, and they spill over into other decisions.

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"I'm in a constant state of dilemma about whether or not to choose hot new technologies when the infrastructure may not support them," says U. Ghosh, director of corporate planning of BPL Telecom and CIO of BPL Group in Bangalore. Of course, the good news about poor telecommunications infrastructure is that it's pushed India to become an early adopter of wireless technologies. Cell phones and other personal digital assistants are ubiquitous among Indian businesspeople, who will be quick to embrace wireless technologies and standards as they emerge. A new trend among foreign companies is to move into newly constructed high-tech office parks such as Electronic City in Bangalore, HITEC City in Hyderabad and Tidel Park in Chennai. These ultra-modern facilities include private power, water, and telecommunications and transportation services, and they even have recreation, health-care, shopping and residential facilities to minimize employees' need to leave the cozy confines of work. (For more on these high-tech parks, see "Nirvana [Under Construction]," Page 182.)

5. Allow Plenty of Time (and Patience) for Air Travel

It's actually harder to get into India than it is to get around the subcontinent. This is because every visitor needs a special visa from the Indian Consulate General. Yet these visas are not necessarily easy to obtain because of bureaucratic red tape. For businesspeople traveling to India, special business visas are available from the Consulate General of India for $85 to $150 and are valid for one or more years with multiple entries. The only catches:

- Each visit to India is limited to six months.

- Travelers must produce a letter from their sponsoring organization indicating the nature of the applicant's business, probable duration of stay, and places and organizations to be visited. The letter must also guarantee that the parent company will pay the visitor's basic living expenses.

- Business visas valid for 10 years with multiple entries are available to foreign businesspeople who have set up or intend to set up joint ventures in India.

Typically, travel visas take 15 working days to process, but expedited service is available. Just be sure to track your application's progress; the line between approval and delay (or even denial) can be very thin and entirely dependent on a judgment call within the Consulate General's office. It does pay to establish and maintain a contact with someone in your local Consulate General's office. For more on travel visas, see *www.indanembassy.org/consular/list.htm.*

Once in India, domestic air travel is every bit as reliable (or not) as what we deal with in the United States or United Kingdom. Indian Airlines, Jet Airways and Sahara Airlines are the big domestic carriers, and although they don't run many daily routes between major cities (one or two roundtrips daily, generally), they are inexpensive. It's possible to travel first class between, say, Delhi and Bangalore (roughly 1,000 miles, or the same distance as Boston to Jacksonville, Fla.) for under $500 roundtrip.

Do be prepared, though, for India's full-force airport security measures. Armed guards are everywhere in and outside the terminals, checked and carry-on bags are examined at least twice, and passengers generally are frisked before being allowed even into the departure lounges. Frequently, checked bags must be identified by their owners outside the terminal (sometimes on the runway!) and stamped "OK" by airline personnel before being loaded. On top of the normal hour you should allow for check-in, give yourself an extra hour to clear security before your flight—and an extra hour on top of that if you're leaving the country and have to clear customs.

resources

For more information on doing business in India, see:

publications

Culture Shock—India: A Guide to Customs and Etiquette
by Gitanjali Susan Kolanad, Graphic Arts Center Publishing Company, 1993

Fodor's Exploring India
Fodor's Travel Publications, 1998

Insight Guide: India
by Insight Guides, Langensche, 1999

online

Embassy of India
Washington, D.C.:
www.indianembassy.org

Indian IT information:
www.indianitonline.com

National Association of Software and Service Companies
(India's national IT industry association):
www.nasscom.org

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6. The Priciest Hotels Provide the Best Value

If you're staying in India for more than just a few days, your best bet is to check into one of the major five-star hotels, which offer Western-style amenities at Indian-style prices. The Oberoi, Taj Group and Welcome Group all operate lavish facilities in each of India's major cities. Prices range from $150 to $250 per night (with discounts for extended stays), and the amenities include large rooms, ample work space, business and laundry services, multicuisine restaurants, meeting room space and on-demand limousine rental. In addition to being ideal places to host business meetings, these hotels offer good networking opportunities with fellow foreign travelers. And although stomach disorders are a rite of passage for most visitors, the hotel restaurants do adhere to basic health standards, and they serve plenty of bottled water—a must in India, where tap water (even for teeth-brushing) is always suspect.

7. Resist the Urge to Get Behind the Wheel

Do not drive in India. Do not let your employees drive in India. The streets are way too congested with cars, trucks, motorbikes, bicycles, pedestrians and livestock, plus the local driving customs (lots of horns, little courtesy) are puzzling to most foreigners. When first arriving in India, call ahead to your hotel and arrange for a pickup (a driver will show up outside the terminal, holding a sign with your name on it), or go directly to the prepaid taxi booth inside the terminal and pay a set fee (tip included). Do not just leave the terminal and expect to hail a passing cab. You'll only be met by a sea of porters and cabbies eager to serve, and there is no way to differentiate between the honest businesspeople and those who will try to take advantage of your naivete. We know one unsuspecting visitor whose unscrupulous cab driver tried to charge him $60 for a $7 trip to a hotel in Mumbai. Once settled in, rent a driver, not a car. Chauffeur-driven cars are available commercially and through the hotels and even some businesses for rates of about $25 to $40 per day—a bargain considering the time and energy you'd lose trying to navigate these streets by yourself.

> Do not drive in India. Do not let your employees drive in India. The streets are already too congested, plus the local driving customs are puzzling to most foreigners.

8. In the Workplace Hire Local

India is a nice place to visit, but it would be difficult to transfer foreign staff there long term. First of all, work visas only allow for six-month stays, but the greater challenge is for Westerners to adjust to life in a developing country. The sheer volume of pollution, people and poverty would be sensory overload for many foreigners on extended stays in India. These days, with ubiquitous e-mail and viable videoconferencing, companies are advised to hire locally and manage remotely. Even without the cultural advantages (which are considerable), think of the situation in pure economic terms: Well-paid Indian business professionals earn between $8,000 and $12,000 per year—a bargain in any country. Do be aware, though, that the Western concept of teamwork is foreign to some Indians. "The average Indian is a philosopher, but two of them together can be a disaster," says Vasant Kumar, vice president of strategic planning and CIO of Ranbaxy Laboratories in New Delhi. "The average Indian, whether he is a programmer or a business systems designer, is an individual; he delivers as an individual. How do you make him work as a team? That is a challenge for us to face."

9. Adjust to the Indian Life (and Work) Style

Forget your notions about leaving the U.S. rat race for a slower, easier lifestyle. If anything, Indian businesspeople work more days and longer hours than we do, and they rarely turn off their telephones. The

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Indian workday generally runs from about 9 or 10 a.m. until 7 or 8 p.m., while the workweek is Monday through Saturday, although the five-day workweek is catching on as a perk in Western-influenced companies.

Deependra Moitra, general manager of quality for Lucent Technologies India Product Realization Center in Bangalore, describes the average Indian IS professional's workday: "He typically arrives at 10 a.m., spends 30 to 45 minutes at the coffee machine talking to colleagues. Then he takes a lunch break, a tea break and ends up staying late at night to get the work done. People from the United States or Germany come here and are shocked that we're not working as hard as they do, but we are—just differently."

Another adjustment for foreigners is the ubiquity of cell phones. It seems like every business professional carries a cell phone in India, and—perhaps as a result of phone lines being historically unreliable—no ringing phone goes unanswered. Desk phone or cell phone, in the middle of a private meeting or not, if the phone rings, Indians are likely to answer it and deal with the caller's situation before getting back to yours. They'll also expect you to respond similarly to them when they call—even if they reach you at the hotel at night or at home over the weekend.

We mention caste just because it can be jarring for Westerners to suddenly be confronted by the disparity between India's haves and have-nots.

10. Be Prepared to Confront Caste Issues

India's historic caste system of segregation supposedly was done away with by the Indian Constitution in 1950. Yet during the month *CIO* toured India, one of the big news stories in the newsweekly *India Today* was about two young lovers who were exiled from their village because they married from within two sub castes—an act considered incestuous to higher-caste village elders. Not only was the couple exiled, but their families were excommunicated as well.

Indeed, the caste system, originally established as a means of keeping India's invading Aryans from mixing with the country's dark-skinned natives, remains prevalent in Indian society. While more a part of everyday life in the villages, castes still play significant roles in the cities—and in business. The big daily newspapers are filled each weekend with matrimonial ads from upper-caste Brahmin men seeking "fair-skinned" brides. City streets are lined with lower-caste women who sweep the dusty roads with flimsy hand brooms. Even most business offices have a "peon pool" of worker-caste laborers who spend their days waiting for a supervisor's summons to serve coffee, set up a meeting room or clean up a mess. Such obvious caste signs are an eye-opener to foreigners, but to Indians, they're a legacy.

We mention caste just because it can be jarring for Westerners to suddenly be confronted by the disparity between India's haves and have-nots. And frankly, the recent influx of IT wealth has only widened this gulf in favor of those Indians who are fortunate enough to work in the IT sector. Some observers are optimistic that IT dollars will have a trickle-down effect and improve the standard of living for all Indians. Others foresee only greater disparity and displays of social unrest. Just this past August, the city of Bangalore was shut down for two days by rioters upset by the kidnapping of local film star Rajkumar. N. Kailasnathan, vice president of IT at Titan Industries, a Bangalore-based watchmaker, feels the riots were less about the kidnapping and more about the growing frustration of the have-nots in the Silicon Valley of India. "I think we will see a lot more situations like that," Kailasnathan says. "A lot of social issues are going to come." CIO

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CIO Field Report: Education

The Learning Channel

On a backstreet in Delhi, school children flock to use a PC built into a hole in the wall with free Internet access.

PHOTO BY NAMAS BHOJANI

India's greatest challenge is brain drain, the loss of its best IT graduates to jobs abroad—here, an ad for foreign jobs in Bangalore.

India has developed a global reputation for producing the best and brightest IT minds. What's its secret?

BY TOM FIELD

Driving through the slums of Bangalore is an assault on the senses. Dirty, naked children play outside makeshift shanties, the pungent smell of fresh urine wafts through the window, and as the car halts at an intersection minutes from the glass-enclosed towers of Bangalore's high-tech

PHOTO TOP BY JOHN CHIASSON

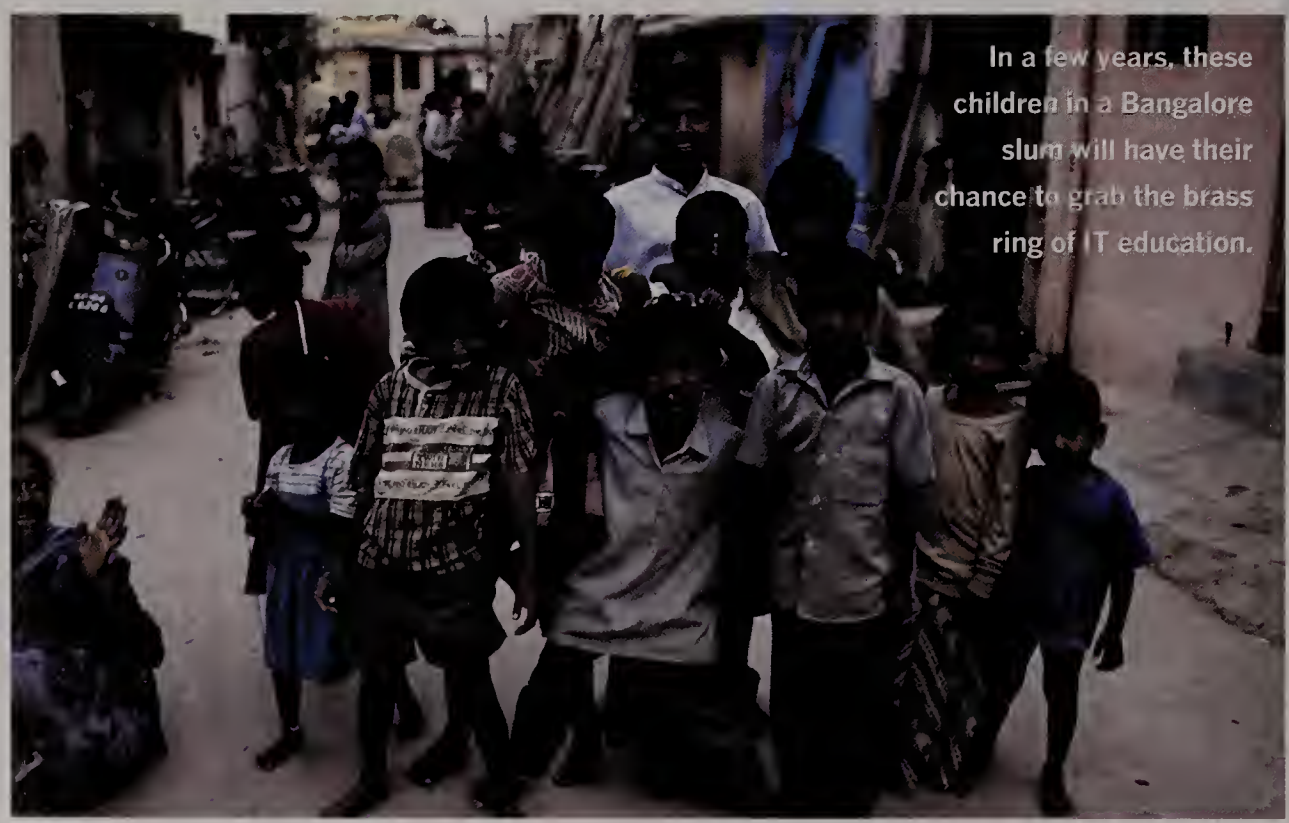
haven, rag-draped beggars rap on the windows to demand a handout.

India, as anyone who has been there can attest to, is a country of contrasts. And those contrasts are nowhere more stark than between the poverty that tarnishes its rural and urban landscape and the promise that defines its global IT industry. The single bridge between the two is education, and that explains India's most powerful and recurrent dream: creating the greatest skilled IT workforce the world has ever known.

Already, Indian schools produce 73,500 IT graduates per year—a staggering number considering the country's 64 percent literacy rate. (By comparison, the United States produces roughly 35,000 IT graduates per year, according to the National Science Foundation.) But it isn't just that India educates a lot of IT professionals; the ones who graduate are good. There are legions of top-notch software engineers, many of whom have been trained in mathematics since they were old enough to walk. Indian schools are respected worldwide for their ability to produce the best and brightest IT minds. The country's six elite, federally funded Indian Institutes of Technology (IITs) aren't just compared favorably with MIT and Stanford University; they're noted for producing the leaders of such world-renowned companies as Infosys Technologies, McKinsey & Co. and Sun Microsystems.

It's not that India is any better at training IT professionals than the United States or any other developed country. The tools and the textbooks are the same, and even in the rigorous IITs, once the students get past the grueling entrance exam, they claim to enjoy the same four years of "work hard, party harder" as their counterparts on U.S. campuses.

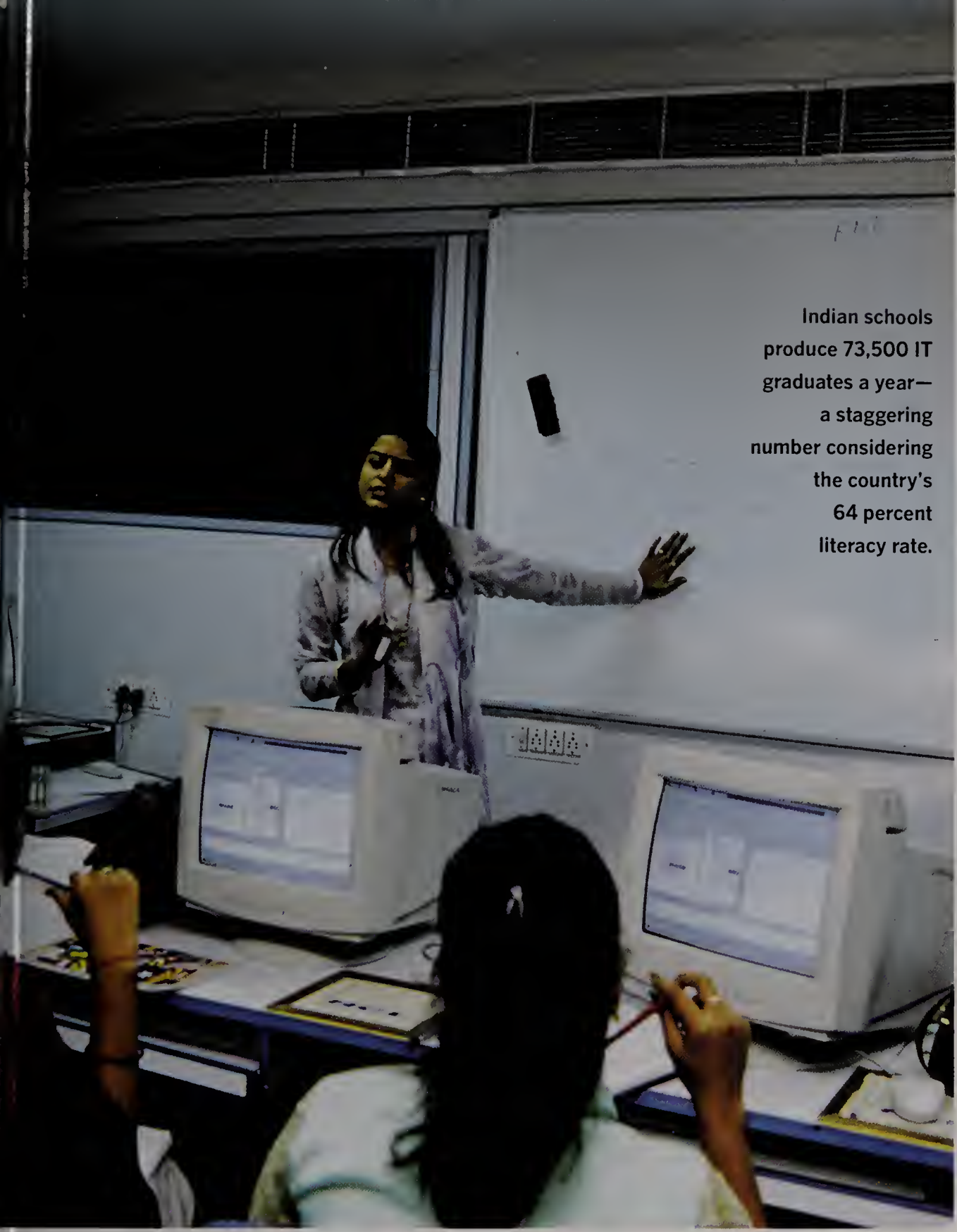
India's differentiator is desire. Young people there are desperate to escape from the grinding poverty that surrounds them or flee their families' middle-class existence and seek a fortune in the United States or United Kingdom. Since it is widely known that IT careers pay much better than virtually any other profession, IT is where many of them set their hopes. Students throughout India



In a few years, these children in a Bangalore slum will have their chance to grab the brass ring of IT education.

PHOTOS THIS PAGE BY JOHN CHIASSON

Even in India's poorest slums, education is embraced as the one accessible means to a better life.



Indian schools produce 73,500 IT graduates a year—a staggering number considering the country's 64 percent literacy rate.

PHOTO BY NAMAS BHOJANI

fiercely compete to gain entrance to the IITs, which accept only 2.5 percent of the students who apply every year. Of those 2,500 who gain admission, just 5 percent are women and only 22.5 percent are chosen (by quota) from India's poorer castes. And those who don't make it into one of the venerable IITs can apply to a state-run engineering school or one of the new Indian Institutes of Information Technology (IIITs or the Triple ITs), educational establishments recently created from an infusion of public and private monies. As a result, the odds Indian students face in IT are better than in most other professional opportunities. And India's IT graduates are literally the best and the brightest the country has to offer.

Pity the Children

For most Indian students, the winnowing process begins at age 4. That's the beginning of subprimary, which leads to kindergarten and a 12-year elementary education that is similar in style to the British system, but closer in substance to Japan's. Youngsters generally attend school six days a week, enjoy far fewer days off than their U.S. peers, and they bring home hours of homework every night—particularly in mathematics. Even in the poorest Indian villages, education is embraced as the one accessible mean to greater wealth, so the pressure to succeed is great. "There is always pressure at a very young age," says S. Gopalakrishnan, deputy managing director and cofounder of Infosys Technologies, one of India's leading IT software companies. "Sometimes you pity the children."

By the time they reach the equivalent of high school age, Indian students start thinking about their careers. If they have what it takes and aspire to earn big money, they basically have two choices: medicine or IT. Until recently, those who opted for IT had few options. The vast majority who didn't gain entrance to an IIT could attempt entry into one of India's 14 state-run regional engineering colleges, which had their own slightly-less-demanding entrance exams. These state-run schools graduate 2,000 IT engineers per year. If they couldn't make it there, they couldn't make it anywhere in IT.

Recently, the rules have changed. Since the Indian IT industry took off in the mid-1990s, the central and state government have loosened their grip on education. They've sought partnership with the private industry, which has resulted in the creation of the Triple ITs. And for-profit training providers such as NIIT Limited have emerged as serious options for students seeking entry-level IT education.

Drawing on its greatest natural resource—a population of 1 billion people—India is preparing to double, maybe triple, its number of annual IT graduates. But just like the United States, India's biggest challenge is finding enough qualified educators to teach its students. Teaching is not a well-paid profession in India, and, in many cases, those instructors who do have strong IT skills would prefer to ply them than teach them. Even the prestigious IITs have difficulty recruiting and retaining qualified teachers from the private industry.

But unlike the United States, where government, industry and academe struggle to find common ground, India's ruling educational forces are all on the same page. While the acronyms are confusing, the existence of the IITs, IIITs and the for-profit NIIT illustrate how India's central and state governments, academic

Professor S. Sadagopan says of the demand for IT training at his school, the IIIT-Bangalore: "It's like the California gold rush."

institutions and private enterprises have pooled their resources for the common goal of producing more skilled IT professionals.

A Ticket to the Good Life

Anand Sanghi, a 30-year-old CEO of an Internet startup, remembers what it was like before India's IT boom.

As a middle-class youngster growing up in Bangalore in the mid-1980s, Sanghi had two choices when he turned 15: study medicine or engineering. He didn't like dissection, so he opted for engineering—and a shot at getting into one of the prestigious Indian Institutes of Technology—the IITs. There are six of them—the oldest at Kharagpur was established in 1950, while the youngest at Guwahati is only 6 years old. Chartered by the federal government and funded by a combination of public and private endowments, the IITs are hell on prospective entrants, but heaven for those lucky few who gain entry. An IIT degree is such a ticket to success in the new, global IT industry that India frequently trots out the boast (unsupported by any evidence) that the IITs produce more millionaires per capita than any university in the world.

> The demand for an IT education is growing faster than India's schools can supply faculty and classrooms.

For two solid years, Sanghi took a correspondence course that prepared youngsters for the IIT entrance exam. Ten hours of pretesting per week—that was the regimen. "The rest of my life was shot," Sanghi says. "[Preparing for the IIT exam] was everything."

Finally, at age 17, Sanghi took the IIT entrance exam, which has been described as the toughest in the world. Three three-hour exams over two days covering chemistry, mathematics and physics—all open questions, no multiple choice. Today, applicants take a multiple choice exam of three hours, followed by three two-hour essay exams over a two-day period. Each exam is individually graded by an IIT educator. More than 100,000 students take the exam each year, but only 2,500 gain entry into one of the IITs. And ranking absolutely counts. If 2,500 prospective entrants score in the 90 percentile or better, then the 2,501st student in the 89 range is out of luck.

Sanghi was one of the lucky ones. Not only did he pass, but he was selected to attend IIT-Madras at Chennai, the most respected of the schools. Graduating after four years in 1992, Sanghi went to the Indian Institute of Management at Ahmedabad for a post-graduate degree in management. In 1994, he left India for a corporate planning and mergers and acquisitions job at a Hong Kong finance company. Seven years later, he's just returned to launch his own startup, Idika.com, an Internet portal based in Hyderabad. Reflecting on his IIT education, Sanghi says, "The experience gives you the confidence that nothing is too difficult to do. It opens doors...and nobody ever asks about your GPA. If you survived, they know you're good."

Today's IIT hopefuls have it even tougher than Sanghi did. Now, instead of two years, they spend three or more preparing for the

PHOTO BY NAMAS BHOJANI

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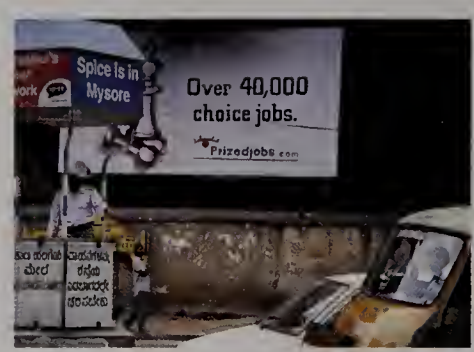
entrance exam. And the competition is so tough that even scoring in the 90 percentile is no guarantee of entry.



But, then, life is also tougher for the IITs, which find themselves at ground zero of India's booming IT industry. The pressure is on to boost enrollment and create new software engineers to fill new jobs. And so now the IITs, which have cherished their exclusivity, are under increasing pressure from the central government to open their doors while maintaining high standards.

"Quantity expansion must not be at the risk of quality dilution," says R. Natarajan, director of the IIT-Madras. Located on a 620-acre nature preserve, the Madras campus hosts over 3,000 students, 1,521 faculty and staff, and countless species of birds and deer, which roam freely and without fear. First opened in 1959, this IIT has recently celebrated its 40th anniversary, and Natarajan has been a teacher or administrator at the school for 25 of those 40 years.

In discussing the schools' greatest challenges, brain drain is topic No. 1. For all the IITs' worldwide esteem, in India they are criticized for enabling—even encouraging—the country's top engineering talent to leave for greener, global pastures. And while many expats such as Sanghi have recently returned to India to head Internet startups, some observers question whether they will stay if and when the dotcom boom goes bust.

The other big challenge is growth. The Madras school has been asked by the central government to triple enrollment over the next 10 years. Finding students isn't a problem. Of the 100,000 who take the IIT entrance exam each year, probably 20,000 could qualify for admission, Natarajan says. But finding qualified faculty—that's the trick. As in the United States, India teaching salaries are significantly lower than those in big business, and Natarajan complains that he cannot even guarantee reliable power, telecommunications and water supplies for resident faculty and staff.

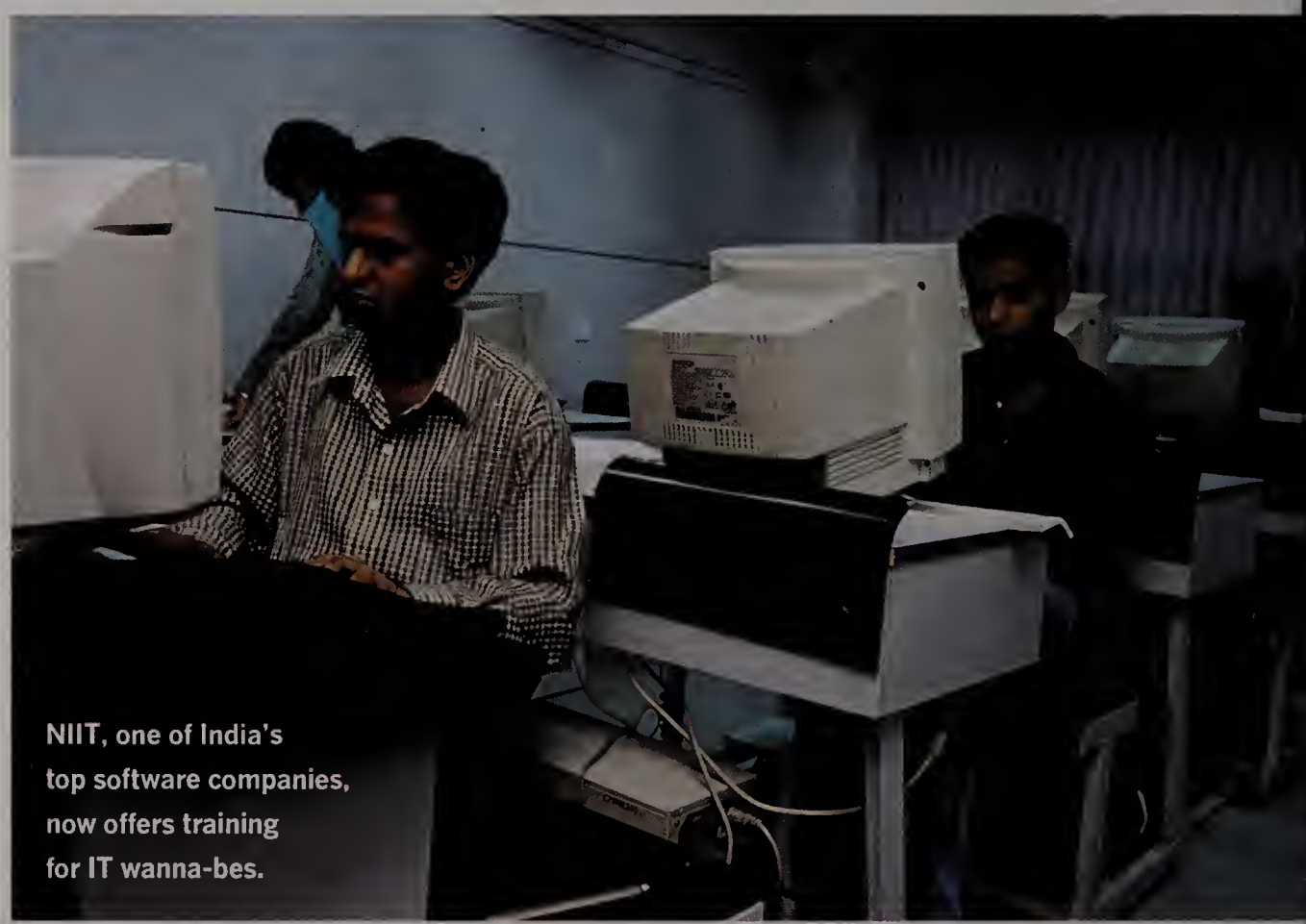
Finally, there is the question of whether the IITs can help India grow its IT industry. "There seems to be an image—I hope it's not a mirage—that India is good at IT," Natarajan says. But to become what he calls a "knowledge superpower," the country must do more than fill jobs and provide IT services; it must build products, create a domestic marketplace for these products and earn a reputation for delivering high-end strategic services. Yet even in the Madras school's home city of Chennai, where its leaders boast of producing an electricity surplus, power outages are frequent, and the literacy rate for the entire state hovers at around 70 percent. "I would like India to be a knowledge superpower to contend with," Natarajan says. "Whether it can be is another question."

Despite ultramodern facilities, the IT schools cannot guarantee reliable power and telecommunications.

IIITs: New Kids in Town

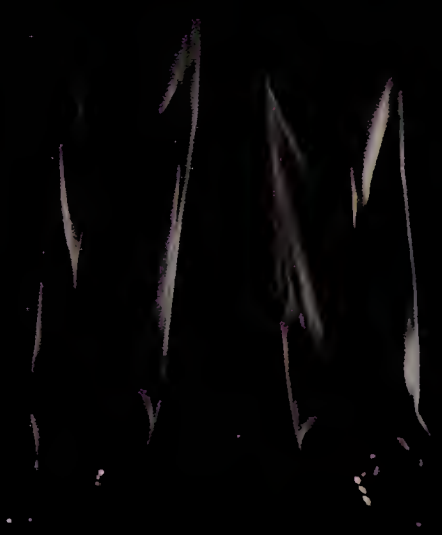
Professor S. Sadagopan is excited, and when he's excited everybody knows it. He smiles, gestures, beams. And he's excited now because he's showing off his classroom at the Indian Institute of Information Technology-Bangalore. The ultramodern room seats only 50 students, but it is equipped with state-of-the-art video conferencing technology that allows Sadagopan not just to teach but to interact with two adjacent 50-student classes

PHOTO BOTTOM BY NAMAS BHOJANI. PHOTO TOP BY JOHN CHIASSON



NIIT, one of India's top software companies, now offers training for IT wanna-bes.

WHAT DOES THE NBA MVP ON THE LEFT HAVE TO DO WITH THE IT VP ON THE RIGHT?



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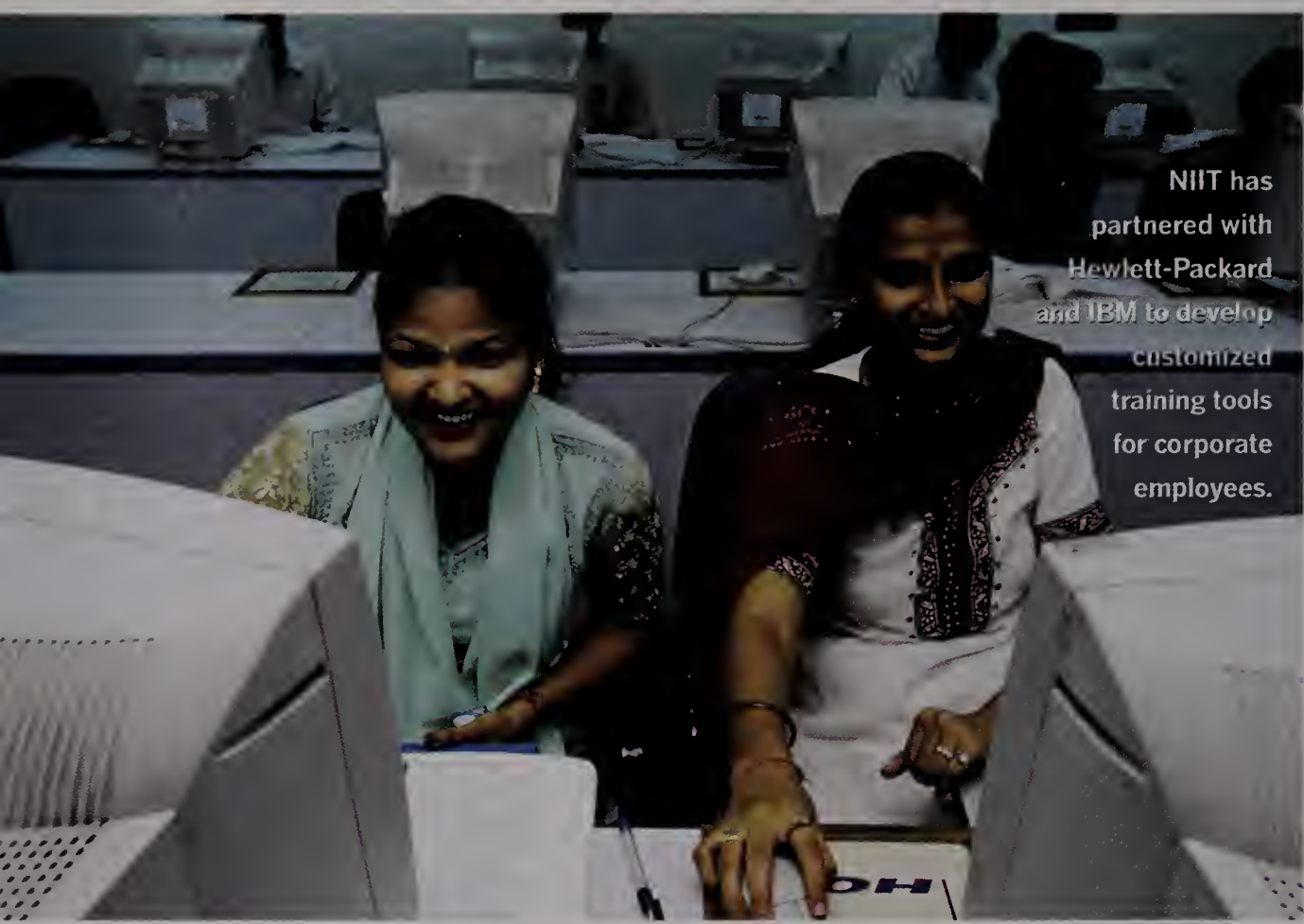

NIIT has partnered with Hewlett-Packard and IBM to develop customized training tools for corporate employees.

simultaneously. "It's like the California gold rush," Sadagopan says of the demand for IT training at his brand-new school. "People are dying to get into computer science." And as director of the Bangalore school, he's delighted to give them the chance to get what they want most—a career in IT.

Located at the International Technology Park on the outskirts of Bangalore, the school is one of two up-and-running IIITs—the other is at the Hyderabad Information Technology Engineering Consultancy City (HITEC City)—with two more in the works. Representing a true public-private partnership, the IIITs were established by their local state governments, which provided land and infrastructure, and private enterprises such as Apple Computer, IBM, Microsoft and SAP, which provide ongoing funding, instruction and technology.

The government's goal for the Triple ITs is simple: to augment the nation's six IITs and the states' regional engineering colleges with new, state-of-the-art facilities geared toward equipping new IT professionals with the skills they need to step right into good jobs. The vendors' objectives, of course, are to teach their own technologies to these students and then have a ready-made feeder program for internships and eventual employment.

> To become a knowledge superpower, India must improve its infrastructure and literacy rate.

"The goal is to create for our Silicon Valley an institute that will do for us what Stanford did for the real Silicon Valley," says Ajay Sawhney, the special secretary of IT and special officer of IIIT-Hyderabad. "We want to see a mix of high-end educational research, development of IT and entrepreneurs."

The Triple ITs certainly are wired for high-level learning. In addition to the ultramodern facilities, students have access to computer labs with almost round-the-clock Internet access. By contrast, at the prestigious IITs, students and faculty alike are housed in aged dormitories with cranky infrastructures. And, in a benefit not available at the IITs, students at the Triple ITs are also given the chance to network and even intern with IT companies located in the tech parks around their schools.

Since opening in September 1998, the IIIT-Hyderabad has attracted about 300 full-time students, while the IIIT-Bangalore has about 150. "Students are not an issue," says Sadagopan. "We need faculty." Currently, the Bangalore school has five full-time faculty, but Sadagopan hopes to hire 15 more—if he can find them. The story is the same in Hyderabad, which would like to grow its enrollment to 1,500 students—if it can hire enough teachers.

One hope of the Triple ITs is that, through the private sector partnerships, they can find new ways for students to stay in India rather than emigrate to the United States or United Kingdom. "Possibly only 5 [percent] to 10 percent will really stay in India, but 5 [percent] to 10 percent can make a huge difference," Sawhney says.

When the Triple ITs first started taking shape over two years ago, the local excitement was over the involvement of big-name vendors such as Motorola and Oracle. But that enthusiasm is changing, Sawhney says. "Now in the last 10 to 12 months we've seen a lot of [new ventures] sprouting up. We're going to create our own big names."

In Bangalore, Sadagopan is thrilled to see interest in the field to which he's devoted his life's work. But he is also realistic. "It is not that the students love the computers; they want the dollars."

NIIT: Bringing IT to the People

On a well-traversed backstreet in Delhi, there is a hole in a stone wall. In this hole is a PC with a 24-hour Internet connection. It doesn't cost anything to use; there are no rules, no supervision, although the computer is securely in place to discourage would-be thieves. This is an experiment to see if common people—the 99 percent of Indians who don't have formal exposure to computers—

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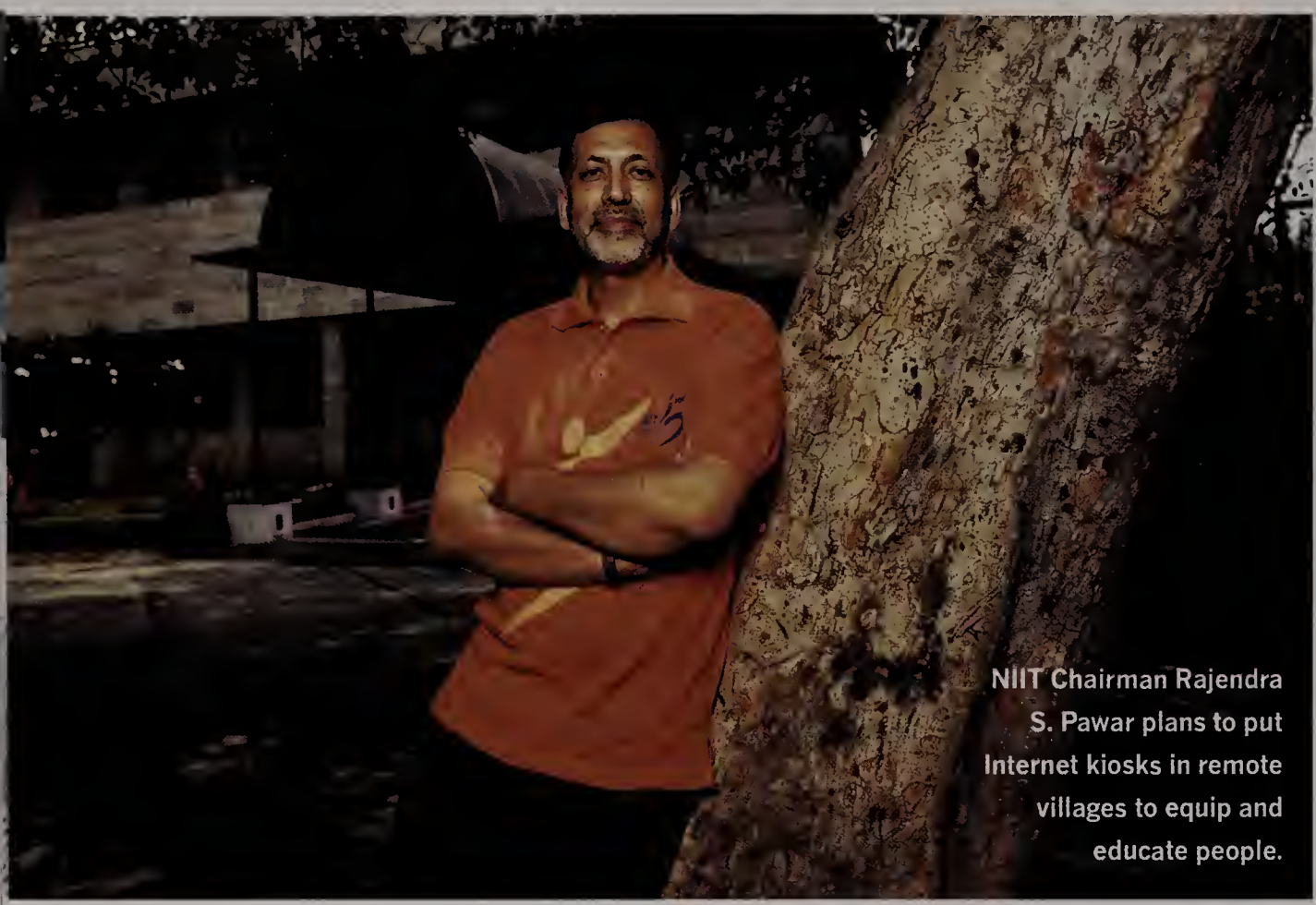

NIIT Chairman Rajendra S. Pawar plans to put Internet kiosks in remote villages to equip and educate people.

will learn to navigate the Internet on their own. And they do. Not constantly, but frequently there is a small crowd of people—children mainly—gathered around this hole in the wall, tuning in and turning on. Will these children grow up to be the IT superstars of tomorrow? Who knows? But they stand a better chance of it since the appearance of the hole-in-the-wall PC than before.

The hole-in-the-wall experiment is the brainchild of NIIT, one of India's top IT training and software export companies. Based in Delhi, NIIT operates 1,113 IT training centers in 21 countries, offering skills-based training to corporations and common people alike. And nowhere does NIIT have a higher profile than in India, where company founder and Chairman Rajendra S. Pawar wants his company to be the one that ensures equal opportunity for all Indians in the growing IT industry.

Founded in 1982, NIIT began as a computer-skills training vendor, even though at the time India's import regulations were such that incoming hardware and software products were slapped with a 114 percent duty fee. Still, enough PCs and software were made in India that during NIIT's first 10 years, the company was quite successful as a training center. From 1982 to 1992, 80 percent of the company's business was education (20 percent software products), and 93 percent of it was conducted domestically.

NIIT officials understand that India's real IT growth hinges on development of a domestic marketplace for IT products.

But beginning with the federal reforms of 1991, NIIT's business model changed. Suddenly, with the advent of free(er) trade with foreign partners, the company's international software products swelled to occupy a significant part of the business. Today, 53 percent of NIIT revenues come from software products and 47 percent from training; 47 percent from the domestic marketplace and 53 percent overseas.

By virtue of its software business, NIIT has already grown to be India's sixth-largest exporter of software products. But Pawar understands that the country's real IT growth hinges on development of a strong domestic marketplace for IT products and services. "We should do as much for the rest of the country as we do for the rest of the world," Pawar says.

Already, NIIT provides IT education through classrooms and via the Internet. The company has created a library of 335 multimedia titles, and it has partnered with vendors such as Hewlett-Packard, IBM and Microsoft to develop customized training tools. A person preparing for Microsoft certification, for instance, can take an NIIT preparatory course.

But the key to reaching the common people, Pawar believes, is to equip them, then educate them. The hole-in-the-wall computer was one step; next, perhaps, NIIT will place Internet kiosks in remote villages. "All villages have TV and telephones, but not every house does," Pawar reasons. "They become a shared service. So, what if we put Internet kiosks in slum villages as a shared service?"

There are critics, certainly, of NIIT's approach. "Yes, [NIIT and other for-profit education vendors] develop people with IT skills, but only for repetitive tasks," says N. Lakshmi Narayanan, president and COO of Cognizant Technology Solutions, a Teaneck, N.J.-based outsourcing vendor. Narayanan argues that the Indian IT industry needs more people skilled in multiple IT and business practices, not just discrete skills.

Arguably, Pawar's village kiosks could spawn some self-taught IT whiz kids who, with some further guidance, could become the skilled people Narayanan wants. Pawar argues that this indeed will happen, given time. "We can't take people off the streets and make them productive [in IT] today," Pawar says. "But it won't take years. It can be done in just weeks and months." CIO

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COLUMN >

Implementing service levels key to .NET success

Microsoft recently unveiled its .NET platform in San Francisco. The .NET platform evolves the current DNA programming model into one that is more in tune with the World Wide Web. According to Microsoft, the .NET platform provides "an underlying technology fabric and development framework that is uniquely suited to building and integrating Web Services."

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Compaq's wireless strategy includes wireless e-mail, intranet and Internet access devices

Call it a wireless request. Corporate IT departments have gotten the message loud and clear from their users: Find a wireless system that will give mobile workers their e-mail while they're on the road.

To help those IT departments, Compaq is offering portable wireless e-mail, intranet and Internet access devices that integrate with Microsoft Windows 2000 and earlier versions of Windows.

The mobile wireless solution from Compaq provides IT departments with two things they badly want: A single-source vendor that will help with the sometimes-difficult wireless installation, and a non-invasive connection to Windows that doesn't tamper with the mission-critical Exchange Server.

For the user, Compaq's wireless strategy is to extend the Windows operating system look-and-feel to mobile workers, notes Brant Jones, manager of marketing for Compaq Internet Solutions Group, adding, "The customer accesses his or her corporate data at all times, whether it's inside the office building or across the country."

Compaq's non-invasive approach uses back-end servers that act as intermediaries between mobile wireless devices and the Exchange Server.

"Customers do not want new software monkeying with the Microsoft Exchange environment," Jones says. "They want the wireless solution to be a separate module that they can turn on and off at will without impacting the Exchange environment and network."

Martin Reynolds, vice president and research fellow at the Gartner Group in San Jose, Calif., says the appeal in Compaq's wireless strategy is its promise to integrate wireless mobile service with a customer's main messaging system, while at the same time maintaining security and reliability.

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— Bruss Bowman, founder, QCSI

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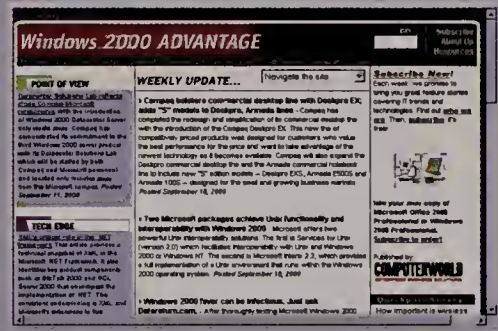
Windows 2000 Advantage is underwritten by Microsoft and Compaq. Its charter is to address the issues that most concern IT managers charged with keeping their companies on top of the latest and best solutions Microsoft and Compaq have to offer. Toward that goal, we offer a wide range of stories including case studies, columns and news to provide you with information you can't find anywhere else.



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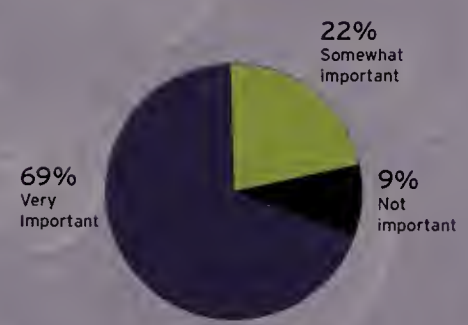

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India's "laptop minister" pushes IT agenda in the face of natural and political disasters BY TOM FIELD

PowerPoint Pr

For a while there late this summer, it looked like India's laptop minister might crash.

We're talking about N. Chandrababu Naidu, chief minister of the state of Andhra Pradesh. Now serving his second four-year term as this state's top elected official (a role somewhat similar to that of a U.S. governor), Naidu has staked his career—and his state's future—on the promise of IT. He was the first Indian politician to "discover" the IT industry, if you will, and when he was first elected in 1995, he came to office with a penchant for PowerPoint presentations. Hence, the nickname laptop minister, which has stuck to Naidu as tightly as he's stuck to his agenda of promoting IT as a means of eradicating poverty, creating new jobs and elevating India from its "developing nation" status. Under Naidu's leadership, Hyderabad, the capital of Andhra Pradesh, has emerged as a global IT hotspot. When Bill Gates looked outside the

PHOTO BY JOHN CHIASSON

N. Chandrababu Naidu, chief minister of the state of Andhra Pradesh, claims to be the first Indian politician to understand the promise of IT.

Under N. Chandrababu Naidu's leadership, Hyderabad has emerged as a global IT hotspot.

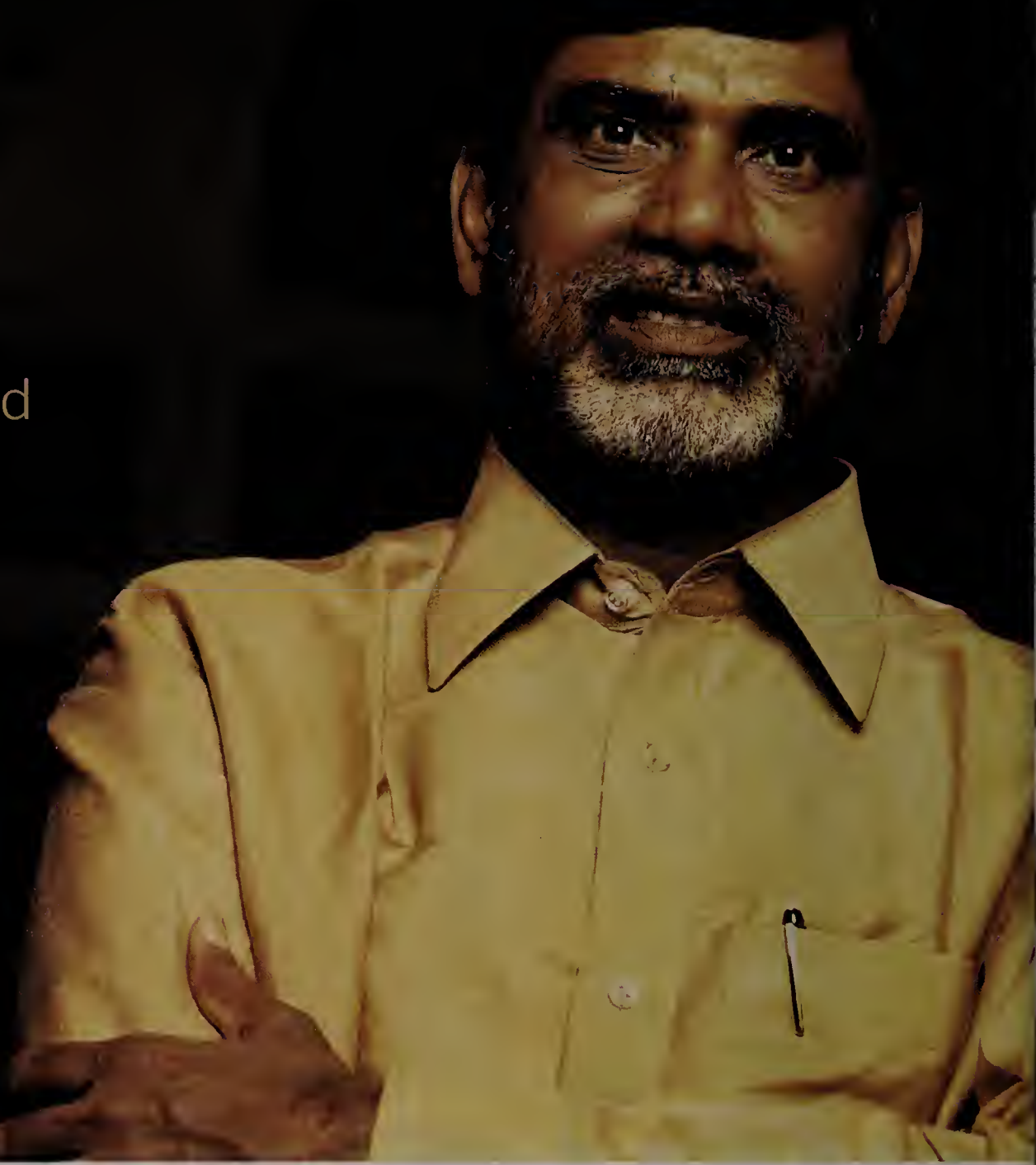

PHOTO BY JOHN CHIASSON

United States to build Microsoft's first offshore development center, he built it in Hyderabad.

When President Bill Clinton visited India this year and wanted to talk technology, he met with Naidu, the self-proclaimed CEO of Cyberabad.

And yet his critics argue: What good was IT last August when Andhra Pradesh was hit with its worst monsoon rains in 50 years? Twenty-four centimeters of rain fell in 24 hours, smashing Hyderabad with a deadly flood that killed 142 people. To his credit, Naidu was at the forefront of the flood relief effort, and he didn't duck any of the questions about why his vaunted IT didn't do a better job forecasting the weather. Still, the lingering image of that tragedy is a newspaper editorial cartoon that depicts Naidu and his laptop alone in a lifeboat, adrift in a city called Hydrobad.

Just days after the flood waters receded, Naidu was swamped with the tide of political discontent over his recent power tariff increase. Emotions erupted into an Aug. 28 riot that injured 180 people and killed four. Again, Naidu's IT agenda was a hot topic in the post-riot discourse. Not only was Naidu forced to defend his public policy, he also had to protect himself from the threat of suicide squads that supposedly were gunning for him.

When *CIO* caught up with Naidu in mid-September, it was within the fortified walls of the Andhra Pradesh State Assembly Building in Hyderabad, where the chief minister was surrounded by armed guards, plainclothes security and bomb-sniffing dogs. But not even those confines, nor the challenges that necessitated them, were enough to shake Naidu's faith in IT as the vehicle to free India from the tyranny of poverty. "IT cannot do everything," Naidu says in his thick, Telugu accent, the native dialect for Andhra Pradesh. "IT can help eradicate poverty, and people are saying, 'Why can't we do it now?' But that is impossible. Nations are built over a period of time. For everything, there is a gestation period."

Ahead of His Time

Naidu, 50, discovered IT in 1985, when, as the newly appointed general secretary of the state's Telugu Desam party, he got his first PC and set about reorganizing the business of public policy. As he rose through party ranks, Naidu became *(continued on Page 164)*

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Takin' It to the Streets

Hyderabad e-government initiatives bring city services to the people

AN ELDERLY WOMAN walks into a municipal office in Hyderabad's Banjara Hills region. She's waving her water bill, which she clearly cannot read—she's illiterate. But she patiently takes a number at the reception desk, waits her turn and then is called into the service office. There, behind one of 12 PC terminals, sits a Hyderabad city employee who not only explains the woman's bill, she also accepts payment and records it electronically via a high-speed network linked to the city's main database downtown. In less than 10 minutes, the elderly woman is out of the office, water bill paid.

This is Twins in action. Hyderabad's Twin Cities Network Services project (known as Twins) is a new e-government initiative that brings one-stop city service shopping to the common folk of Hyderabad and sister city Secunderabad. In a nutshell, Twins is a series of strategically placed remote, automated integrated citizen service centers that allow citizens to register their cars, receive their driver's licenses, and pay their city utility and tax bills electronically. No hassling with the mail, no standing in long lines at four separate offices to perform these simple tasks.

Twins is the pet project of J. Satyanarayana, secretary of IT for the state of Andhra Pradesh. The goal is to simplify the delivery of city services. The system is very basic: a client/server model that relies on Web browsers on the front end, an Oracle relational database on the back end, and an Oracle Web application server and reliable ISDN lines in the middle.

Equally impressive is the state's Computer-aided Administration of Registration Department, or Card. Card compresses and simplifies the cumbersome process of property title searches and real estate transfers.

"We may not be ahead of the times in the use of IT for commercial purposes," says S. Ashok, subregistrar and marriage officer for the state. "But when it comes to using IT for the common man, we are very much ahead." ***–T. Field***

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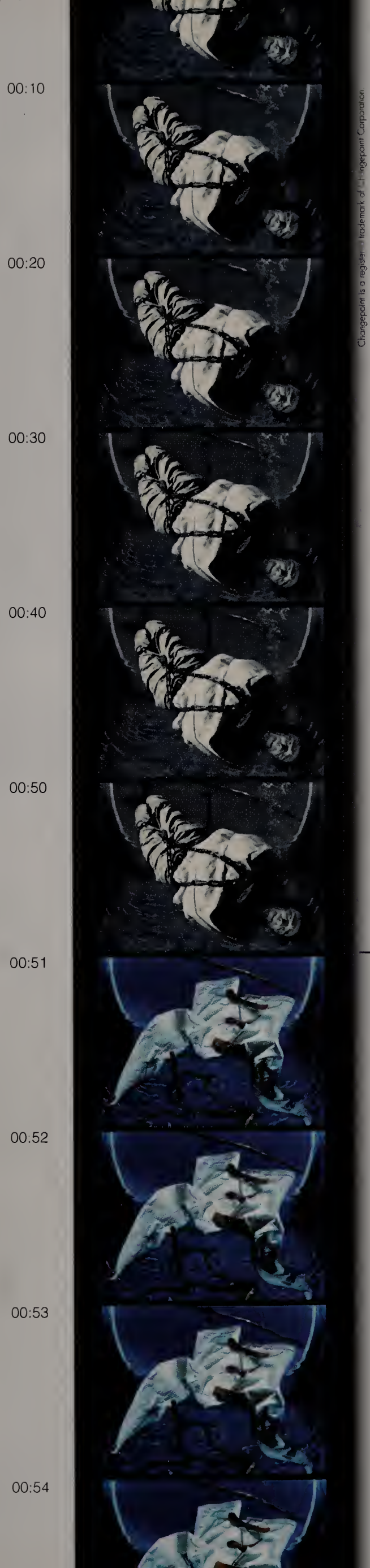

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When is your point of change?

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(continued from Page 160) known for both his computer-generated presentations and his pursuit of streamlined government processes through IT.

Already dubbed "laptop minister" by the time he was elected chief minister in 1995, Naidu quickly learned just how meager the state government's general IT awareness was. For example, soon after taking office, Naidu asked an assistant whether his office was equipped for PowerPoint. "We'll check," he was told. That staffer soon returned and announced, "You have three PowerPoints in your office." Puzzled by the answer, Naidu pushed for clarification. "See?" the staffer said, pointing to the office's three electrical outlets. "Three power points."

Around that same time, Naidu inquired how many PCs were in the state. The answer: 80,000. Realizing that number had to be off by more than a few thousand, Naidu probed. It's true, he was told. Andhra Pradesh really did have 80,000 PCs—police constables, that is.

Obviously, much has changed since 1995. Naidu is surrounded by advisers and secretaries who understand and support his mission. As a result, Andhra Pradesh today is a model of Indian e-government initiatives (see "Takin' It to the Streets," Page 162), and Hyderabad has become home to dozens of IT businesses, schools and software development centers. Naidu has built a reputation for being business-friendly, promoting new incentives (free land, permits and tax breaks) for IT businesses that settle in Andhra Pradesh. Through healthy doses of policy making and self-promotion, Naidu has come to personify his entire nation's development as an IT superpower. And he's not shy about taking credit. "I have brought some psychological change [to India]," Naidu says. "Everybody in India thought, 'We cannot [succeed in IT]. We're not America; we're not Singapore.' We have changed that climate. Now everybody thinks we can do it." Naidu is quick to point out that he was the only politician promoting IT five years ago, and he's quicker to point out that all Indian politicians are talking tech today. "When I initially began to focus on IT, many people thought I was pursuing an elitist agenda," Naidu says. "Now everyone realizes the importance of IT for India's future."

Of course, not all Indians are happy with Naidu. Beyond the normal political opponents (and in India's multiparty democracy, elected officials have plenty of those), Naidu is dogged by detractors who resent his prominence and minimize his efforts. "In a sense, what Naidu did was find a market niche that was unoccupied by other politicians," says D. Prakash, IT secretary for the neighboring state of Tamil Nadu. "He found IT was the flavor of the month, and he saw economic conditions where he could do something [with IT]." Of Naidu's efforts to change government's rules and provide special incentives solely to IT businesses, Prakash chooses his words carefully. "Some people can argue he was being entrepreneurial," Prakash says. "Others can argue it was ridiculous."

> "Everybody in India thought, 'We cannot succeed in IT. We're not America; we're not Singapore.'"
>
> –N. Chandrababu Naidu, chief minister of the state of Andhra Pradesh

National Ambitions

Frankly, Naidu doesn't much care what other states have to say. He's focused on bigger and better things—perhaps with an eye toward running for national office at the end of his term in 2004. Increasingly, Naidu is focused on IT issues of national importance. As cochairman of the country's National IT Task Force, he was influential in the recent decision to deregulate telecommunications, and his has been one of the loudest voices calling for bringing Internet connectivity and IT services to India's remote villages. Although PCs are expensive and telephone lines are unreliable at best in India, Naidu points out that the country has 37 million cable TV subscribers who would benefit from some version of WebTV.

"Distance learning, telemedicine, e-government and e-commerce are all areas that can have tremendous impact on the lives of ordinary villagers," Naidu says. "A farmer in a village can improve his earnings through accurate information on market prices, weather conditions and farming practices. The quality of education available to a villager can undergo a sea of change with access to educational content from the best schools, colleges and universities in the world."

And yet the average Indian villager doesn't necessarily share Naidu's perspective on the life-changing potential of IT. Changing this attitude is Naidu's current mission. That's why he's concentrating on new e-government initiatives in Hyderabad, on IT job creation throughout Andhra Pradesh and on improving the entire national telecommunications infrastructure. "I am confident that if we do these things, if people get a taste of [IT services], then they will want to go further, further, further," Naidu says. "Everybody works sometimes for pride, but how to get that pride—how to motivate—that is the stage we are entering." CIO

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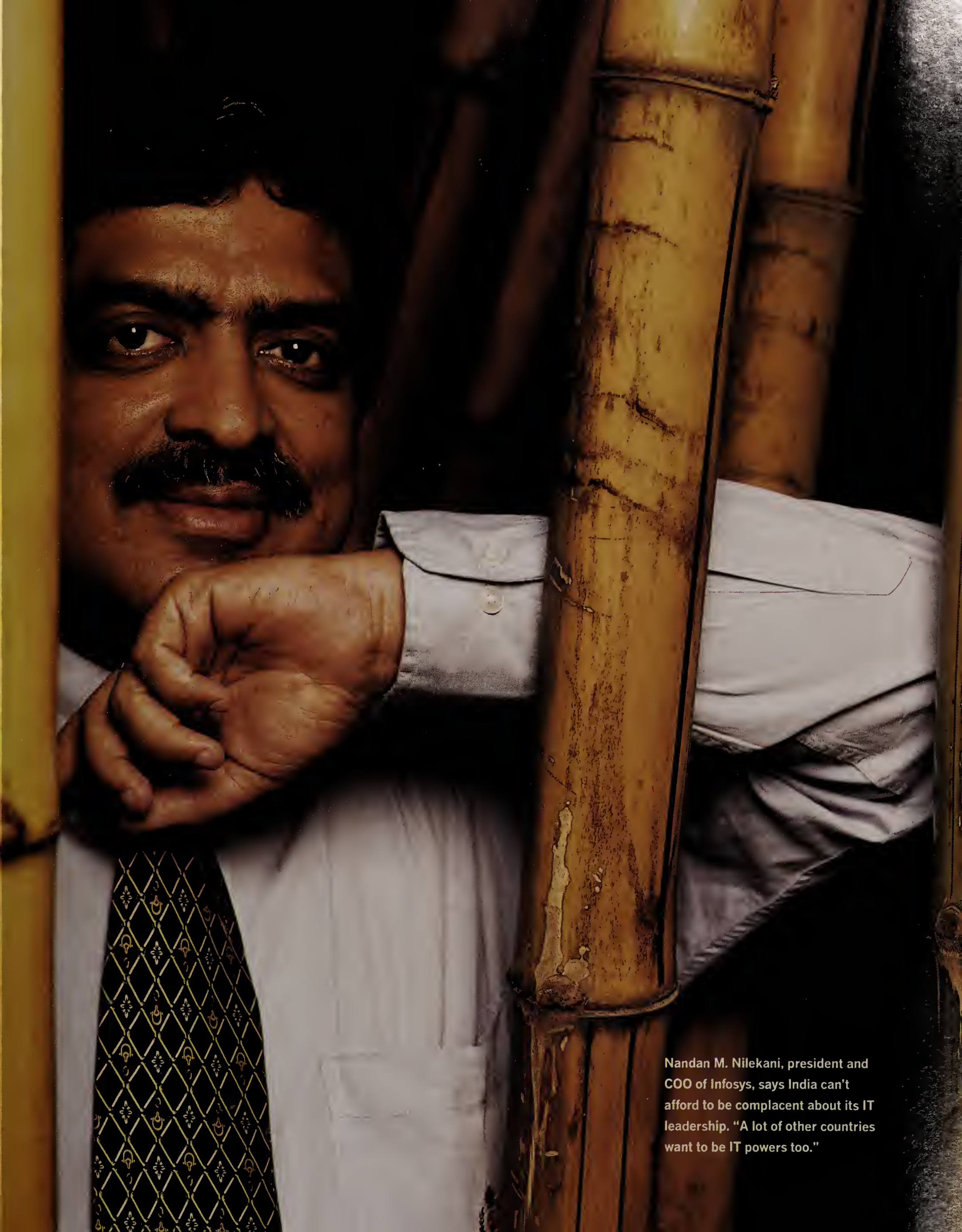
For a Few Rupees More

India's outsourcing industry is eager to move beyond its back-office image BY TOM FIELD

Good stuff, cheap. That's the reputation of India's IT outsourcing industry, and it's both a blessing and a curse.

The blessing is that India has finally been able to seize the global stage by harnessing its greatest natural resource—people—and focusing on filling the world's yearning for IT skills and services. By becoming, as some call it, "the back office of the world," India has grown its IT exports in less than a decade from $150 million to more than $4 billion—10.5 percent of India's total overseas sales. And in so doing, India has built a solid record for developing IT talent as well as delivering top-notch legacy system maintenance and software applications.

PHOTO BY NAMAS BHOJANI



Nandan M. Nilekani, president and COO of Infosys, says India can't afford to be complacent about its IT leadership. "A lot of other countries want to be IT powers too."

The curse is that, despite what IT outsourcing has meant for India's economy, the country's top IT vendors have been typecast, and they're scared. Wipro, Infosys Technologies, TCS—they all hear the approaching footsteps of Ireland, China and the Philippines, the up-and-coming IT service centers. What happens to India if any of these upstart countries learns to provide good stuff, cheaper? At the same time, these vendors feel the pressure of great expectations. They represent India's best hope to achieve economic prosperity in the 21st century, and so they push themselves to develop new products and services to meet projections that India's software exports will exceed $50 billion by 2008. But these companies already have grown so quickly that they now face their own staffing crunch. They compete with one another—and with their foreign customers—to recruit and retain thousands of young, restless programmers who want to get their hands on the hottest new IT projects. Yet how do India's IT vendors grow their businesses and create these hot, new projects when they're stuck with this label of "good stuff, cheap"?

"India has been branded as a country with a lot of cheap people available, and that's a lot of baggage to carry," says Soumitro Ghosh, general manager of worldwide marketing at Wipro, based in Bangalore. "We're trying to change that image. Getting work is not difficult; getting the right kind of work is difficult. We have to convince customers that they can outsource high-value work to India."

Toward that end, India's top IT services vendors are changing their marketing strategies. They're downplaying the legacy systems work, software debugging and "body-shopping" (sending Indian programmers overseas to work on assignment for customers) on which they built their businesses in the '90s. Instead, they're pinning their 21st century hopes on e-business development, new software products and end-to-end business/system consulting—high-profile, high-paying projects that will improve their ability to stave off competition, grow their companies and retain staff.

The country's top IT vendors feel the pressure of great expectations. They represent India's best hope to achieve economic prosperity.

Fueling this shift is the fear that if India's vendors don't somehow escape the reputation for good stuff, cheap, then their good fortune will go away as quickly as it arrived. "Despite what companies—even our own—might say, we know that the work we currently do is work that someone else chooses not to do," says N. Lakshmi Narayanan, president and COO of Cognizant Technology Solutions, a Teaneck, N.J.-based IT services vendor that operates several software development centers throughout India. "Certainly these services are business-essential, but they are not business-critical. For us to really be at the leading edge, we have to get into business-critical systems."

The Indians make a strong argument. Nobody can beat their price—software programming in India costs roughly $35 per hour, as opposed to $200 in the United States—and their quality is world-class. In fact, of the 23 companies worldwide that have been awarded the United States-based Software Engineering Institute's Capability Maturity Model (SEI-CMM) Level 5 rating for fault-free software engineering processes (the equivalent of a perfect 10 in Olympic competition), 15 of those elite companies are Indian, among them Infosys, NIIT and Wipro.

There's only one problem with this scenario: What if their customers don't want to expand their offshore relationships? Indeed, some of India's best customers say their entire offshore strategy is based on the premise of good stuff, cheap.

"We're looking for lower prices and quality people," says Kelly Robinson, CIO and vice president of operations at E-Health Solutions, an Arlington, Texas-based health-care provider that outsources data entry to India. "If [Indian vendors] take away the low-end work, we'll start looking elsewhere."

As for the hot, new projects, those are the ones many CIOs reserve for their own restless staffs. "Those projects are the ones that keep the local superstars working for me and not somewhere else," says one manufacturing company CIO, who prefers to be anonymous. "I'm in deep trouble if I lose those folks."

Which isn't to say Indian vendors don't stand a chance of attracting higher-level, higher-paying projects. In fact, some market analysts believe that window of opportunity is open now. "In general, I'm finding a sense of hostility on the behalf of U.S. companies toward the Andersens, KPMGs and [other consultancies]," says Marty McCaffrey, executive director of Software Outsourcing Research, a Salinas, Calif.-based company that has tracked offshore outsourcing trends since 1996. "CIOs feel they're not getting

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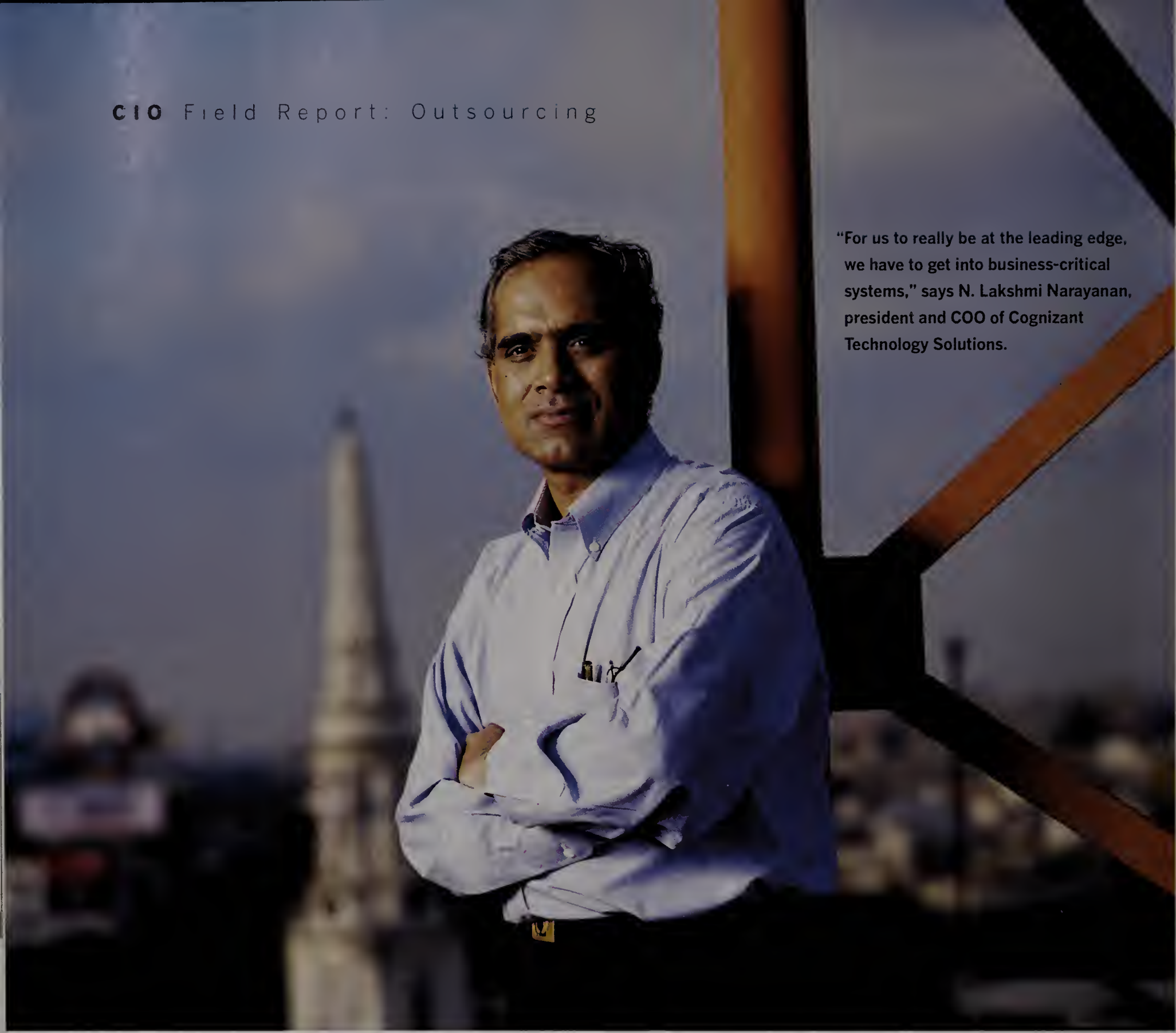

"For us to really be at the leading edge, we have to get into business-critical systems," says N. Lakshmi Narayanan, president and COO of Cognizant Technology Solutions.

PHOTO BY NAMAS BHOJANI

their money's worth from these companies."

If Indian vendors suddenly appear with lower-cost, high-quality business services, then they will find an eager customer base, says McCaffrey. The key is developing those services within a matter of years, if not months. "They can be the equals of the best of our [business-service] companies in a very short period of time," he says.

Consider, after all, how quickly India built the entire offshore outsourcing industry.

Birth of an Industry

The offshore outsourcing industry as it's known today began in 1972. That's when TCS, founded by India's multi-industrial Tata family in 1968, sent its first technical staff overseas to work onsite for United States-based customers. "Body-shopping" is how the practice came to be known, and it was popular during the offshore industry's first 20 years, as foreign companies enjoyed the benefits of augmenting their own staffs with India's ready, willing and cheap labor.

But beginning in 1991, when ex-Prime Minister P.V. Narasimha Rao's government initiated a series of economic reforms to open India's borders to foreign trade, the offshore industry began a gradual transition from staffing to services. Suddenly, foreign customers, particularly those in the United States, realized that India wasn't just a source of cheap IT labor, it was a place where top-quality IT services could be performed effectively, inexpensively and in a time zone that gave Western companies nearly around-the-clock access to IT talent. Since 1991, scores of big-name companies (including General Electric, IBM, Microsoft and Texas Instruments) have outsourced certain back-office functions or, with help from the vendors, opened software development centers staffed and managed entirely by Indian programmers.

It's an understatement to say that the

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1991 economic reforms changed the fates of several companies. In a decade's time, TCS, the first to outsource these services, has become India's biggest outsourcing vendor, exporting roughly $400 million in IT services annually. Wipro, which tried and failed to market its own project management software product in the early '90s, now is the nation's No. 2 IT services exporter and was the first company in the world to achieve SEI-CMM Level 5 status. Infosys, a software development company founded in 1981 by seven friends who borrowed startup money from their wives, now is No. 3 among India's IT outsourcing companies and No. 1 in polls ranking India's most admired companies.

It's equally an understatement to say that as these IT services companies have grown, so has the nation. Not only do IT exports account for more than 10 percent of India's total exports, but the Indian IT industry employs roughly 320,000 people—and at a far higher standard of living than people earn in other professions. The average professional salary in India is equal to $4,000 to $6,000 per year, but entry-level software engineers can earn anywhere from $8,000 to $10,000. And the growth potential for the industry and its employees alike is tremendous. A recent industry survey by India's National Association of Software and Service Companies projects that the country's IT industry could earn $87 billion and employ 1 million people by 2008.

To the Indian mind, which reads math equations like poetry, these projections are nothing short of inspirational. "In the brick-and-mortar world, there were always limitations," says B. Ramalinga Raju, chairman of Satyam Computer Services, India's fourth-leading IT services exporter. "IT has brought an opportunity for this country to reach out to the world. In today's world, it doesn't seem to make much of a difference where I'm working. The world has become the marketplace for India."

Growing Pains

In the early years, the biggest challenges for India's IT services companies were matters of perception and communication. Customers had a hard time getting past the image of offshore outsourcing companies as high-tech sweatshops populated by scores of Indian cybercoolies working for bread, rice and spare rupees. And if they did rise above that stereotype, then customers frequently became entangled in project management issues complicated by geographic and cultural differences. Once customers visited India and saw the truth for themselves, half the battle was won, says R. Ramanan, vice president of TCS in Bangalore. "No customer I've known has visited India and left without changing his perspective on what we can and can't do," Ramanan says.

But understanding what Indian companies can do is one thing; getting out of their way and letting them do it is quite another. The notion of sending IT work 9,000 miles offshore and to a time zone that's anywhere from 9.5 to 12.5 hours ahead of the United States (depending on whether the destination is on the U.S. East or West Coast) was so...well, foreign that customers had a hard time releasing the reins. Consequently, they tended to overmanage the projects to the point where some companies would even send their own staff to India to oversee the vendors' work. "That tendency to overmanage could make [cost] value disappear fast," Ramanan says.

There also were some cultural barriers to overcome. For one, Indians have a tendency to shake their heads from side to side to signify yes—a visual cue that means no in most Western countries. And when Indians want to say no, they aren't always explicit. As opposed to Americans, who generally are quite comfortable voicing their opposition to a proposal, Indians tend to keep their initial doubts to themselves and then express them later, when the project might be in full swing.

These initial challenges were overcome by two factors: successful outsourcing engagements, which built on one another, and the Y2K scare, which created more software programming than any company could handle in-house. Indian companies ended up taking on a lion's share of Y2K work (roughly $2 billion worth of work from 1996 to 1999), which helped cement their reputation for delivering good work, cheap.

The upside of offshore outsourcing's rapid ascent is that it has allowed the Indian vendors to enjoy unprecedented growth. In just the past five years, the offshore outsourcing business has grown from about $734 million to $4 billion. Meanwhile, outsourcing vendors such as Infosys and Wipro have grown from a few hundred employees to several thousand—with no end of growth in sight.

The downside of this explosive growth is that while Indian IT companies have been

While Indian companies have been helping foreign customers mitigate staffing shortfalls, they've been developing a staffing crisis of their own.

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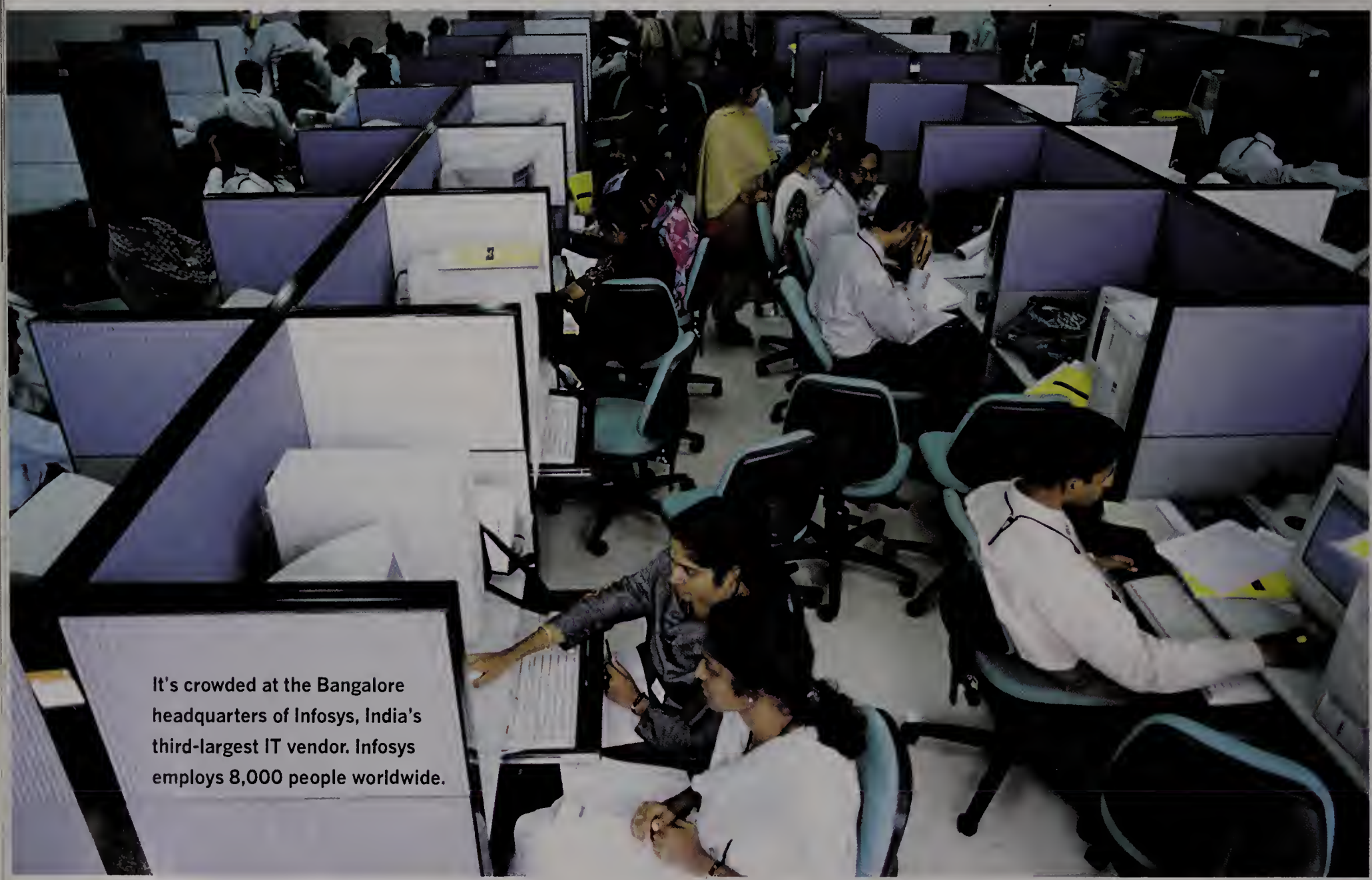
helping foreign customers mitigate staffing shortfalls, they've been developing a staffing crisis of their own. Even in India, after all, the IT labor pool is only so deep. Currently, each of the major IT companies has an attrition rate of 11 percent to 13 percent, which is below average by U.S. standards. But if you consider that these companies are growing on average by about 20 percent per year, you'll see the staffing challenge they face. The engineering schools and universities are turning out tens of thousands of IT professionals each year, and these become the primary focus of the vendors' recruiting efforts. Yet recruiting is only half the battle; retention is the next struggle. More than money, young Indian IT professionals want (not necessarily in this order) the opportunity to work overseas and the challenge of working on the highest-priority projects with the hottest new technologies. But there are only so many overseas opportunities, and for those who stay domestic, the most challenging projects are not the ones that traditionally get outsourced.

And then, of course, there is the specter of mounting competition for the good stuff, cheap business. Countries such as Ireland in the West, China in the East and Israel in the Middle East all fancy themselves as providers of good, inexpensive IT services. Currently, India enjoys first-to-market advantage and owns anywhere from 80 percent to 95 percent of the U.S. offshore market—but not without some healthy fear of losing that lead to a country that might come along and offer better services cheaper. "IT is a very powerful way of raising the standard of living," says Nandan M. Nilekani, president and COO of Infosys. "A lot of other countries want to be IT powers too." Beyond market share, India also enjoys the advantages of possessing a large, English-speaking population and a relatively open, democratic government. But these are hardly



It's crowded at the Bangalore headquarters of Infosys, India's third-largest IT vendor. Infosys employs 8,000 people worldwide.

PHOTO BY JOHN CHIASSON

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insurmountable advantages. "We can't afford to be complacent," Nilekani says.

The New Mandate

To meet their many challenges—grow the business, retain employees and stave off foreign competition—India's IT services companies have adopted a common strategy: Offer higher-level (and higher-paying) strategic business products and services that improve the vendors' value and help anchor restless employees. "For our IT industry to continue to grow as it has, we must change to become an end-to-end solutions provider," says S. Gopalakrishnan, deputy managing director and cofounder of Infosys. This doesn't mean abandoning the bread-and-butter back-office work—not entirely, at least—but rather focusing aggressively on the pursuit of strategic business projects. "We must compete with the Andersen Consultings [of the world] as an end-to-end company," Gopalakrishnan says.

Toward that end, Infosys has just unveiled a suite of e-banking products on which it hopes to build a new financial services consultancy. TCS, meanwhile, is investing 4 percent of revenues in new product research and development, and the company has pledged to make higher-end strategic services 35 percent to 40 percent of next year's total volume of business. "We're seeking more joint ventures, more equity relationships with partners," says Ramanan. "We need to build total-system consultants and system engineers, not software consultants and software engineers."

While striving to offer a higher level of service, some Indian IT vendors are also starting to point to their SEI-CMM Level 5 status and wonder why they're paid less than lower-rated vendors from the United States or the United Kingdom. "Indian companies in many cases have traveled great distances in terms of creating quality of service," says Raju of Satyam, one of India's SEI-CMM Level 5 service providers. "Our customers are now open enough to say that our services are far higher than what the local vendors are able to provide. Companies like Satyam are now becoming more confident asking why there needs to be a difference in price when our value is higher."

Some Indian IT companies are starting to wonder why they're paid less than lower-rated vendors in the United States or the United Kingdom.

But how will these vendors be received when they show up in the United States seeking better projects and pay? With skepticism, says Peter Bendor-Samuel, president of The Outsourcing Center, a Dallas-based outsourcing consultancy.

"I don't blame them for trying. Who wants to be known as the cheapest?" Bendor-Samuel says. Yet cheap is exactly what most CIOs seek first in an offshore relationship.

Beyond price, the Indian vendors will be challenged to demonstrate that their people possess the business savvy to compete with the major IT consulting companies. By their own admission, the IT vendors recruit almost exclusively at college campuses, and the average age among employees at these companies is 26. Hardly seasoned business veterans. Western CIOs may be reluctant to turn over business-critical work to offshore personnel that might not fully grasp business requirements. "I wouldn't be worried about turning over the technology; I'd be worried about [turning over] the business side," says E-Health's Robinson. "[Indian vendors] have the aptitude to learn the business savvy, but they're not going to learn it in India. They've got to come here" and develop U.S. business experience.

Still, McCaffrey of Software Outsourcing Research says that if the Indian vendors acquire these capabilities as quickly and as aggressively as they did their SEI-CMM Level 5 status, then it's not unreasonable to assume that they might carve out a significant piece of the business services pie. "Companies that already embrace offshore outsourcing in general are interested in these [higher-level] services," McCaffrey says. But, he cautions, "it's going to take time, and there will be a learning curve."

Even Bendor-Samuel, who is skeptical that India can compete head-to-head with the major consultancies, does see an opportunity for Indian vendors to leverage their ability to do good work, fast. "People still look at India as a last resort. If they need to get a project done really fast...that's been the 'hot' stuff that's gone to India," he says. "But if India can deliver on time to market, then they will have a nice niche. That's their market space."

But is a reputation for "good stuff, fast" any better than "good stuff, cheap"? It won't be easy for India's IT vendors to change their image. But then Indians are approaching this mission with uncommon zeal. It's not just business they're after; it's opportunity. Indians never quite made it in the industrial age; they don't want to make the same mistake in the information age. As Wipro's Ghosh says, "If we miss this bus, we may never get another opportunity." CIO

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The Retreat features the Tuesday evening dinner and awards ceremony, which honors this year's Enterprise Value Award winners, all of whom have demonstrated business achievement through the innovative use of information technology.

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RETREAT AGENDA

Sunday, January 28

8:30 a.m.
CIO Enterprise Value Retreat Partners' Golf Tournament
Enjoy a round of golf at the beautiful Starr Pass Golf Course

3 p.m. - 6 p.m.
Registration

3 p.m.
Superbowl XXXV Party
Hosted by Tivoli Systems, Inc.
Join other retreat participants to watch the game on the big screen.

7:30 p.m. - 9 p.m.
Partners' Café Reception
Mingle with our Partners and meet your colleagues.

Monday, January 29

7:30 a.m. - 8:30 a.m.
Breakfast

8:30 a.m. - 8:45 a.m.
Opening Remarks and KnowPulse℠ Poll
GARY BEACH
Group Publisher
CXO Media, Inc.
The KnowPulse "Knowledge" poll, an ongoing poll conducted by *CIO* magazine, captures IT and business executives' perspectives on current topics in the news. Past polls have been covered in *CIO* and other prestigious media organizations, including *CNN, Newsweek, The Wall Street Journal,* and *U.S. News & World Report.*

8:45 a.m. - 10:15 a.m.
Retreat Introduction and Welcome Address: IT and the Global Economy
F. WARREN MCFARLAN
Senior Associate Dean
Director of External Relations
Albert H. Gordon Professor of Business Administration
Harvard Business School
McFarlan outlines how new technologies have fundamentally transformed where work is being done on a global basis. The central theme of the Retreat is built around how Hong Kong-based trading company, Li & Fung, together with its Silicon Valley-based software development arm, is opening up new markets by linking factories in East Asia with customers in Europe and in the US.

10:15 a.m. - 10:30 a.m.
Enterprise Value Award Winner Presentation
One of this year's winners and a member of the awards program review board together outline the key implementation success factors of the project.

10:30 a.m. - 11 a.m.
Mid-Morning Break

Noon - 12:15 p.m.
Enterprise Value Award Winner Presentation

12:15 p.m.- 1:30 p.m.
Luncheon

1:30 p.m. - 5:05 p.m.
Industry Briefings
Each of our Partners will lead interactive small group discussions on strategic business and IT issues.

5:15 p.m. - 5:45 p.m.
Global Industry Value Chain Restructuring
F. WARREN MCFARLAN
McFarlan identifies how every aspect of the industry value chain has been deeply transformed by Information Technology. Inbound logistics/outbound logistics and sales, etc., all operate in an entirely different way.

5:45 p.m. - 7 p.m.
Partners' Café Reception
Relax and take the opportunity to share your thoughts with Partners and colleagues.

Tuesday, January 30

7:30 a.m. - 8:30 a.m.
Breakfast

8:30 a.m. - 8:45 a.m.
Enterprise Value Award Winner Presentation

8:45 a.m. - 9:45 a.m.
Evolving Patterns of E-Commerce Management
F. WARREN MCFARLAN
McFarlan shares how e-commerce has completely changed the competitive pattern inside an industry by looking at the brokerage battles. He also focuses on how similar issues are being thought out in the world of B2B E-Commerce.

9:45 a.m. - 10 a.m.
Enterprise Value Award Winner Presentation

10 a.m. - 10:30 a.m.
Mid-Morning Break

10:30 a.m. - 10:45 a.m.
Enterprise Value Award Winner Presentation

10:45 a.m. - 11:30 a.m.
Global Patterns of IT Service Delivery
F. WARREN MCFARLAN
McFarlan engages participants in a discussion on the extraordinary revolution in how organizations are accessing IT capabilities.

11:30 a.m - 2 p.m.
Luncheon & Case Study Workgroups
Participants will break into small groups to analyze the Li & Fung case over a working lunch.

2 p.m. - 3:15 p.m.
Global Security: How To Protect Your Infrastructure Across Borders
A high ranking government official leads a provocative discussion on global security and its impact on your business. How vulnerable are you?

3:15 p.m. - 5:30 p.m.
Informal Networking and Recreation

6:30 p.m. - 7:15 p.m.
Enterprise Value Awards Reception
Meet the Award winners

7:15 p.m. - 9:30 p.m.
Enterprise Value Awards Dinner and Ceremony
Join us for dinner and to celebrate the Enterprise Value Award winners at a ceremony, proudly underwritten by Genuity.

9:30 p.m. - midnight
Dessert Reception
Hosted by Genuity

Wednesday, January 31

7:30 a.m. - 8:30 a.m.
Breakfast

8:30 a.m. - 8:45 a.m.
KnowPulse Poll Results
LEW MCCREARY
Editor in Chief
Darwin magazine
McCreary will present the results of Monday morning's poll.

8:45 a.m. - 10:30 a.m.
Case Study Workgroup Presentations and Discussion with Li & Fung Executives
F. WARREN MCFARLAN
MICHAEL THOMAS HSIEH
President
Li & Fung International, Inc.
Groups will present and discuss their solutions with case study executives.

10:30 a.m. - 10:45 a.m.
Mid-Morning Break

10:45 a.m. - 11:30 a.m.
Management Implications for Surviving in the Information-Enabled Global Economy
F. WARREN MCFARLAN
McFarlan closes the Retreat with a discussion on the specific management practices used by firms that are successfully adapting in the new information age.

ndia

CIO Field Report: High-Tech Parks

The modern, campus-like setting of Electronic City in Bangalore belies the often primitive construction techniques used to build it.

India's IT future includes gleaming, high-tech office parks where employees will work, play, shop and live

BY TOM FIELD

Nirvana

[Under Construction]

In Bangalore, it's Electronic City. Hyderabad is home to both HITEC City and the Satyam Technology Center. Chennai is putting the finishing touches on Tidel Park. ■ Not just high-tech office parks, these state-of-the-art facilities are self-contained IT communities—condo associations, if you will, that, in stark contrast to the slum-ridden chaos that

PHOTOS BY JOHN CHIASSON

In contrast to the poverty that surrounds them, India's high-tech parks provide reliable infrastructure and Western-style amenities.

Women clad in traditional saris work at Infosys Technologies' modern facility at Electronic City.

surrounds them, provide reliable infrastructure and Western-style amenities for tenant companies whose employees work, eat and, yes, even sleep within the walls of these gated business communities.

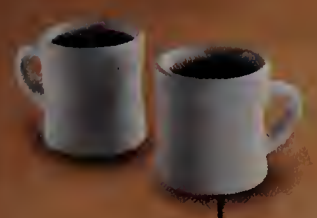
The attraction? Stability. Established mainly outside the teeming cities with their clogged streets, dirty air and patchwork infrastructure, these cybercommunities (cyburbs?) offer reliable power and phone lines, potable water, even transportation amenities that people can't count on in Bangalore or Hyderabad, which spar over the title of "the Silicon Valley of India." But beyond serving basic needs, these new high-tech parks also provide recreation, shopping and health-care facilities, as well as modern residential housing.

Electronic City, largely completed (although still expanding) in 1998, is the first of these futuristic tech parks. Its chief tenant is Infosys Technologies, India's top software services provider and one of the biggest employers in Bangalore. There are 3,500 employees at Infosys headquarters (8,000 and growing worldwide), which is set up like a sprawling college campus. There is a gymnasium, a basketball court, tennis courts, a meditation center and even a practice green for golf. There are three huge food plazas that serve breakfast, lunch and coffee. And there's even a small Domino's Pizza franchise that delivers hot pies to employees who can't leave their desks. There is a music room for stress relief and a band of employees who perform for entertainment. There is an amphitheater for performances, a dance floor and dorm rooms for employees who want to stay over. Infosys also provides bus transportation so that employees don't have to brave Bangalore traffic on their own.

In Hyderabad, an hour's plane flight north of Bangalore, two megapark projects are under way. The first, Satyam Technology Center, owned by Satyam Computer Services (India's No. 4-ranked software services exporter), is a 120-acre facility on the outskirts of the city. Like all such office parks, the Satyam Center provides its own power and water supplies; it also offers a golf course, swimming pool, recreation center, infirmary and residential housing for up to 1,200 employees. Currently, 750 Satyam employees live and work there.

And then there is the Hyderabad Information Technology Engineering Consultancy City (HITEC City), a techno-township being built, marketed and maintained by L&T Infocity, a joint venture of Indian engineering giant Larsen & Toubro (which owns 89 percent of the project) and the Andhra Pradesh Industrial Infrastructure Corp. (a state-affiliated entity that owns the remaining 11 percent). Constructed on 158 acres of land and at a cost of about $375 million, HITEC City is scheduled to be completed in

PHOTOS BY JOHN CHIASSON



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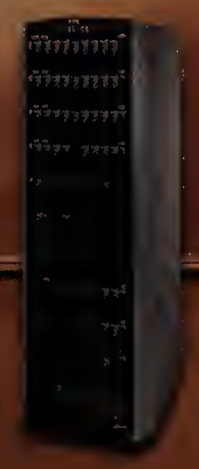

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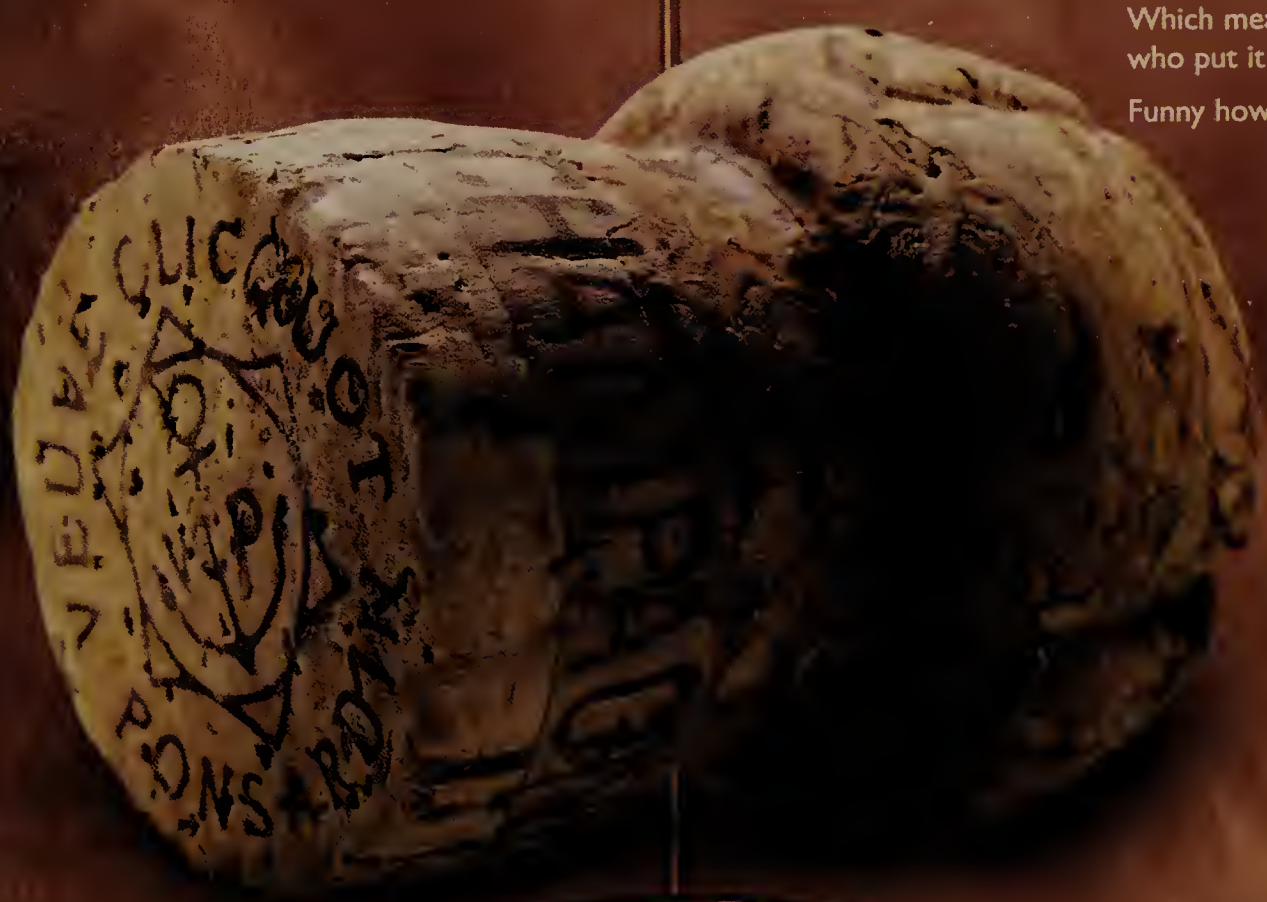

Which meant a toast to the IT wizard who put it all together.

Funny how one thing leads to another.

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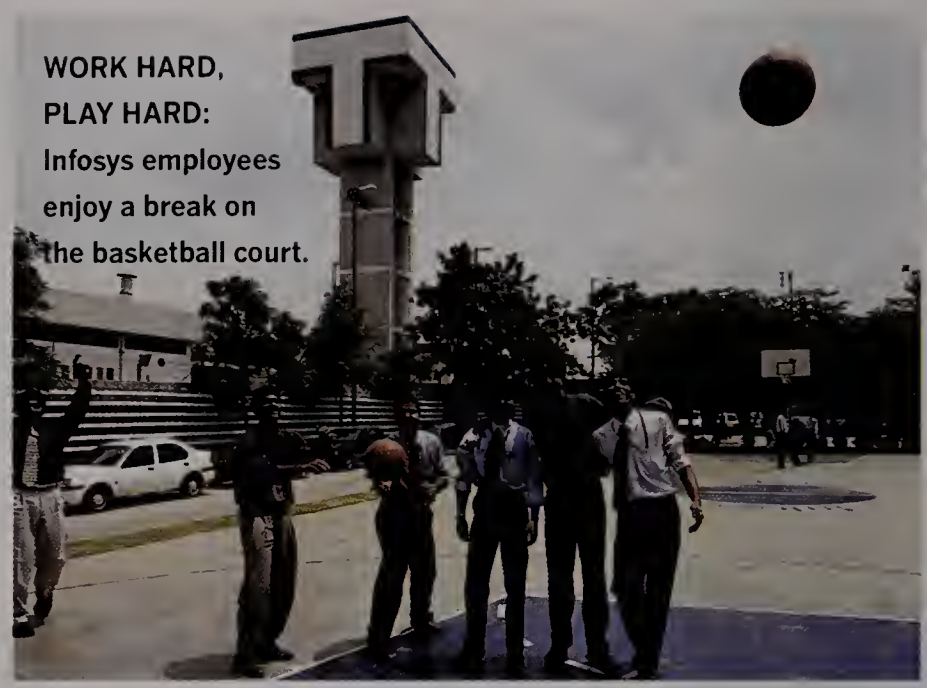
2002 and will include Cyber Towers, a 580,000 square-foot office park that houses its own banks, restaurant, travel agency, shops, and power and water supply. Today, such major names as GE Capital, Microsoft and Oracle operate offshore development facilities or call centers in this 10-story tower. Nearby and under construction is Cyber Gateway, an 866,000 square-foot arched office space that will feature a glass facade, landscaped interior gardens and again its own power supply as well as fiber-optic Internet connectivity. Additionally, there are many undeveloped plots of land on which businesses may build their own structures and still benefit from HITEC City's independent infrastructure. HITEC City will also offer a new hotel and convention center, as well as a golf course, clubhouse, medical center, gas station, firehouse, nursery and shops tending to almost any material need.

Not to be outdone, Chennai (formerly Madras), located on India's southeast coast, counters with Tidel Park, which is scheduled for completion in 2001. Developed by Tamilnadu Industrial Development Corp. and Electronics Corporation of Tamilnadu, Tidel Park offers 1.28 million square feet of office space, as well as a convention hall, health club, two restaurants, guest cottages, travel desk, retail outlets and several banks. The main contractor for the project is Hyundai Engineering & Construction of South Korea. Opened in



WORK HARD, PLAY HARD: Infosys employees enjoy a break on the basketball court.

High-tech parks serve two purposes: They provide a familiar environment for foreign visitors, and they remove everyday obstacles from native Indian employees.

At Electronic City, Infosys employees can choose to have lunch at one of three huge food plazas.

PHOTOS BY JOHN CHIASSON

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THE OLD AND THE NEW AT TIDEL PARK: Women carrying building materials (left); modern equipment in use during construction.

July, Tidel Park is still completing construction, but it is already 98 percent booked and it is occupied by some tenants.

To Americans, these all-in-one tech parks are reminiscent either of the old "company towns," or of the Walt Disney Co.'s Celebration, the planned community built outside of Orlando, Fla.

But to the developers, these cybercities serve two purposes: They provide a comfortable, familiar environment for foreign visitors, and they remove everyday obstacles from the paths of their native Indian employees. There are no traffic jams at these parks, no annoying power outages or water shortages. The phones and plumbing are reliable, and the facilities are kept clean and attractive. From the front gates to the underground parking lots, security is everywhere.

Of course, there's always the question of whether these all-inclusive tech parks will create problems of their own. Once the novelty wears off, for instance, will employees really want to live where they work? And what about the residents on the outside looking in—will the have-nots harbor resentment for the haves?

Fair questions, but not top-of-mind for tech park developers. Preoccupied with mitigating the problems of everyday life today in India, the futurists are betting that these live-at-work facilities will be tomorrow's rule, not its exception. As S.V.L. Narayan, head of corporate communications at Satyam, says, "Once people are here, they are away from all the problems of the city." CIO

Opened in July, Tidel Park is still completing construction, but it is already 98 percent booked and it is occupied by some tenants.

PHOTOS BY NAMAS BHOJANI

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Don't Call It Bollywood

India's film industry is the world's largest and, thanks to IT, it's growing faster than ever

BY CHERYL BENTSEN

When I asked the concierge for a taxi to go interview film director Subhash Ghai at his studio in Mumbai, he sized me up with new respect and summoned a Mercedes instead of the usual Fiat. "Mr. Ghai is the greatest showman in Bollywood," he says. "And he is clean!" This was not a reference to hygiene; India's $1.3 billion movie industry is notoriously riddled with mob interests.

But with Mukta Arts, India's first publicly held movie production studio, Ghai is aiming for corporate respectability. He hopes to capitalize on what many see as India's almost unlimited potential to provide competitively priced, quality content, animation and special effects for the IT-driven entertainment world. "No one could miss the importance of content in the America-Online-Time-Warner deal," he told me. "This is where IT meets the movies."

Last year, for the first time, the Indian government—anticipating software and content opportunities in the convergence of the Internet, communications and entertainment industries—the "ice age," Indians call it—recognized the movie business as a legitimate industry, qualifying the studios for bank loans and tax breaks. Since April, videos, like computer software, are exempt from export taxes.

India is already the globe's largest producer of films, annually cranking out some 800 titles. Exports earned $100 million last year, a tenfold increase since 1990. This year's earnings are estimated at $250 million. Management consultant Arthur Andersen predicts Indian exports will expand by at least 50 percent each year, earning around $3 billion by 2006.

PHOTO BY JOHN CHIASSON; INSET PHOTOS BY FURNALD/GRAY

Billboard advertisements for Indian movies dominate the urban landscape. Inset: Scenes from *Taal*, a Hindi film that enjoyed one of the most successful U.S. debuts.

India's IT software and engineering savvy is spilling into India's fast-growing reputation as an outsourcing center for high-quality, low-cost animation and special effects. (Indian companies typically charge 75 percent less than U.S. companies.) India's Pentamedia Graphics did the 3-D animation for the U.S. film *Sinbad* and will do the same for *Ali Baba and the Forty Thieves*. The company also has deals in France and Japan. Arthur Andersen forecasts that Indian animation exports alone will reach $2 billion in 2003.

The evening we talked, Ghai was working late in a recording studio dubbing a film score. The equipment was impressive—the Fairlight MFX-3 Plus-equipped digital audio workstation is the first of its kind in India. But the building had no air conditioning and was located at the end of a rutted, unpaved road. Mopping sweat from his brow, 57-year-old Ghai took a break and described his plans to expand his setup at nearby Filmcity (a Bollywood production center) into a Hollywood-style studio with state-of-the-art production and post-production facilities for features, advertising, TV films and serials. Some 2.3 million Indians work in the movie business, including technicians, engineers and animators. Employment is expected to grow 70 percent in the next five years.

Ghai is also building a software library with the purchase of video, cable and satellite rights to a dozen movies. "We expect the Internet to come through TV in India," he says. "And the domestic demand for content—films, serials, interactive programming—will be enormous."

An astute businessman with an eye on popular taste, Ghai winced when I referred to Bombay's movie industry as Bollywood. "The BBC invented the term about 10 years ago, as if we were aping Hollywood," he says. "It is scoffing, somehow demeaning. You've seen what India has done with IT. We'll make the same leap with Indian cinema. Our boys are very interested in webcast, interactive TV, animation."

Of Ghai's 14 films, the most successful was the blockbuster musical *Taal* ("Rhythm"), starring a former Miss World. The story: A billionaire's son falls for a plucky village girl who sings her way to the top of the pop charts. In one of the strongest debuts ever for a Hindi film in the United States, *Taal* grossed $788,000 from 44 venues the weekend it opened in 1999 and was ranked 20th on *Variety*'s box office charts. The record for Indian exports is *Kuch Kuch Hota Hai* ("Something Happens"), which has earned $23 million since 1998.

They Are the World

Across Asia, the Middle East, Africa, Japan, the United States, Fiji and even in Russia, Indian movies have become a potent box office draw. The growth in exports is partly fueled by India's diaspora. Some 20 million Indians live abroad. United States-based Indians take their kids to Indian movies to reinforce cultural values. Weak on plot, the movies promote respect for seniors and the benefits of arranged marriages. Two satellite channels based in England and the Arab Gulf—Eros International and B4U (Bollywood For You)—offer nothing but Indian movies.

"Cinema in India is largely escapism," says Pritish Nandy, a writer, TV producer and media personality who is also a member of India's parliament. "It is all about what you want life to be—candy floss, larger-than-life heroes, gorgeous heroines. It is not about real people, real things, but that is India."

A Fistful of Rupees

With new funding opportunities, such as the stock market, Ghai believes the industry will overcome its gangster rep. Since going public in July, his Mukta Arts studio has listed at a premium on both the Bombay and National Stock exchanges. "Mukta got the response it did in the capital markets because we've had a clean record for 21 years," he says.

Still, the work is hazardous. Extortion plots are so common that top directors employ bodyguards. Last year one of India's major film producers, Raksh Roshan, was shot and wounded outside his Mumbai office after refusing to give a gangster overseas distribution rights. At least two other producers have been murdered since 1997, and many more have survived attacks.

Weak on plot, Indian movies promote respect for seniors and the benefits of arranged marriages.

For Indians deeply preoccupied with movie culture, the kidnapping in July of film icon Rajkumar, a star of more than 200 movies, was shattering. The 72-year-old actor—India's answer to John Wayne—was watching TV with his wife and valet at his remote farm, 140 miles south of India's high-tech capital, Bangalore, when the notorious jungle bandit Koose Muniswamy Veerappan and a dozen men in combat fatigues burst into Rajkumar's living room brandishing AK-47s and whisked the actor off to a forest hideaway.

Veerappan, who has eluded authorities for 15 years and twice escaped captivity, is India's most wanted outlaw. In early October, as Veerappan's demand for the release of 51 jailed allies was still unmet (India's Supreme Court barred their release), the actor's whereabouts and fate were still unknown. And the best source of information about the case was, naturally, the Internet. CIO

In the future

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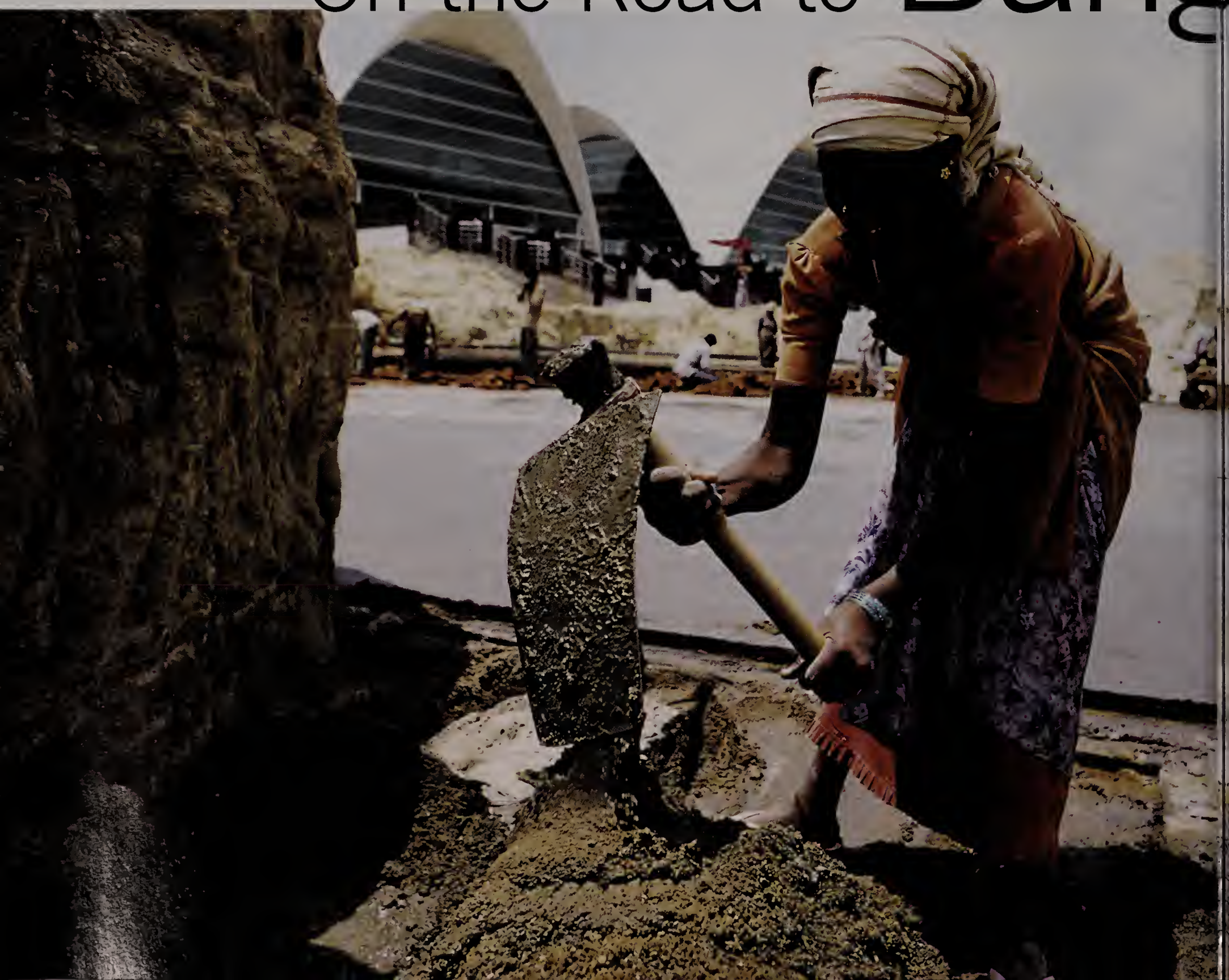
On the Road to Bang



alore

FAR LEFT: Bangalore's beautifully modern high-tech office complexes are built by people—including many women—who frequently wear turbans instead of hard hats and use hand tools instead of power equipment.
LEFT AND BELOW: Clogged streets and devout spirituality: both huge parts of Bangalore life.

By Tom Field

PHOTOGRAPHY BY JOHN CHIASSON

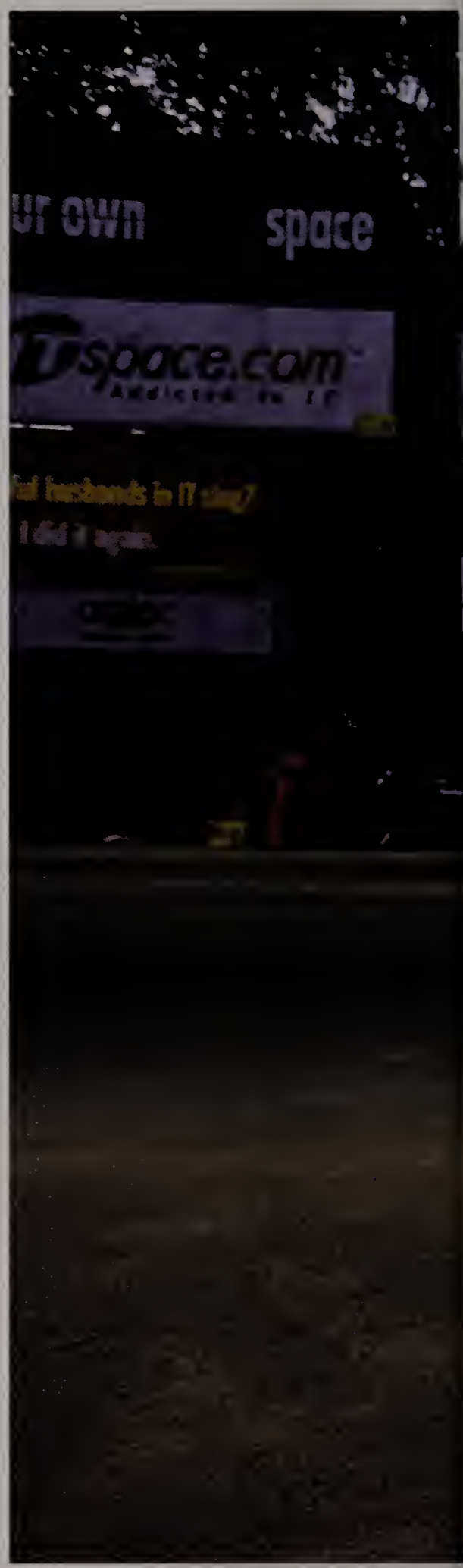
"What's it like?"

Hands down, that's the most common question people ask about India. Primed by media images of rope tricks, snake charmers and cows in the streets, friends are eager to have their preconceptions confirmed or denied. Business associates, meanwhile, who may have read about cybercafes and high-tech office parks wonder "Is it really like that?" Even Indians, who know firsthand what life is like there, can't help but ask because they want to know how India looks through Western eyes.

(continued on Page 199)

India

CIO Field Report



TOP: Construction workers stand atop bamboo staging as they build yet another high-tech office complex. **RIGHT:** Children work in India, as evidenced by this boy's minding the family shop in Bangalore. **FAR RIGHT:** Leaving the Bangalore airport, visitors quickly confront the contrast of dotcom billboards and cattle-drawn carts.

ox-drawn carts sitting in traffic beneath d

com billboards; modern, high-tech office

India

CIO Field Report

complexes being constructed by workers

Well, the answer is too hard to put into words so we put it into pictures. As you thumb through the next several pages, you'll see wildly contrasting photos of Bangalore, capital city of the southern Indian state of Karnataka. These pictures were taken by John Chiasson, a Nashville, Tenn.-based freelance photographer whose work has appeared in *ESPN Magazine* and *Time* among other publications. John accompanied *CIO's* writers in India; as we caught information with notebooks and tape recorders, he captured images with his cameras.

LEFT: A girl doing chores on the streets of Bangalore. **ABOVE:** Locking a door the old-fashioned way.

There's no real order to the photos, but then there's no real order to Bangalore or India. You'll see, as we did, ox-drawn carts sitting in traffic beneath dotcom billboards; modern, high-tech office complexes being constructed by workers wielding hand tools; a sprawling downtown marketplace that accommodates one merchant hawking electronic gadgets and another selling freshly killed chickens; noisy, traffic-clogged streets where no one can get anywhere fast; quietly efficient offices where software engineers conduct the world's business at Internet speed; Indians engrossed in their work; and others caught up in the revelry of the annual festival honoring the Hindu god Ganesh. Flip through the pages and see for yourself what India is like.

ielding hand tools; a sprawling downtow

India

CIO Field Report

TOP: Much of the world conducts business on the busy data servers at Infosys Technologies. **RIGHT:** Mahatma Gandhi Road is Bangalore's Fifth Avenue, a huge shopping district that caters to locals and visitors alike. **BELOW:** The pressure of IT is everywhere in Bangalore.

marketplace that accommodates the m

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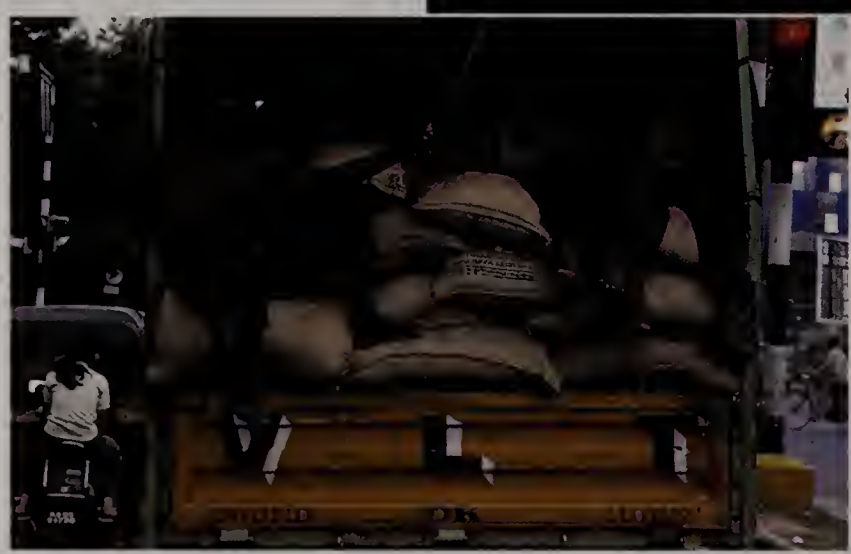
India

CIO Field Report

RIGHT AND BELOW RIGHT: Young IT workers start the day at Infosys Technologies, one of Bangalore's biggest employers. **BELOW LEFT:** After a hard day's work, these men relax on their way home. The bumper that reads "Sound...OK...Horn" gives drivers permission to honk their horns and establish their presence so that they may pull around and pass the truck at their convenience. Horn-honking is not an insult on Indian streets; it is a courtesy.



chant hawking electronic gadgets and t

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India

CIO Field Report

one selling freshly killed chickens; nois

TOP LEFT AND RIGHT: Typical Bangalore workplaces—the open-air market and the IT services office. **LEFT:** September heralds the annual Ganesh Festival in honor of the elephant-headed Hindu Lord Ganesh, god of good omens.

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India

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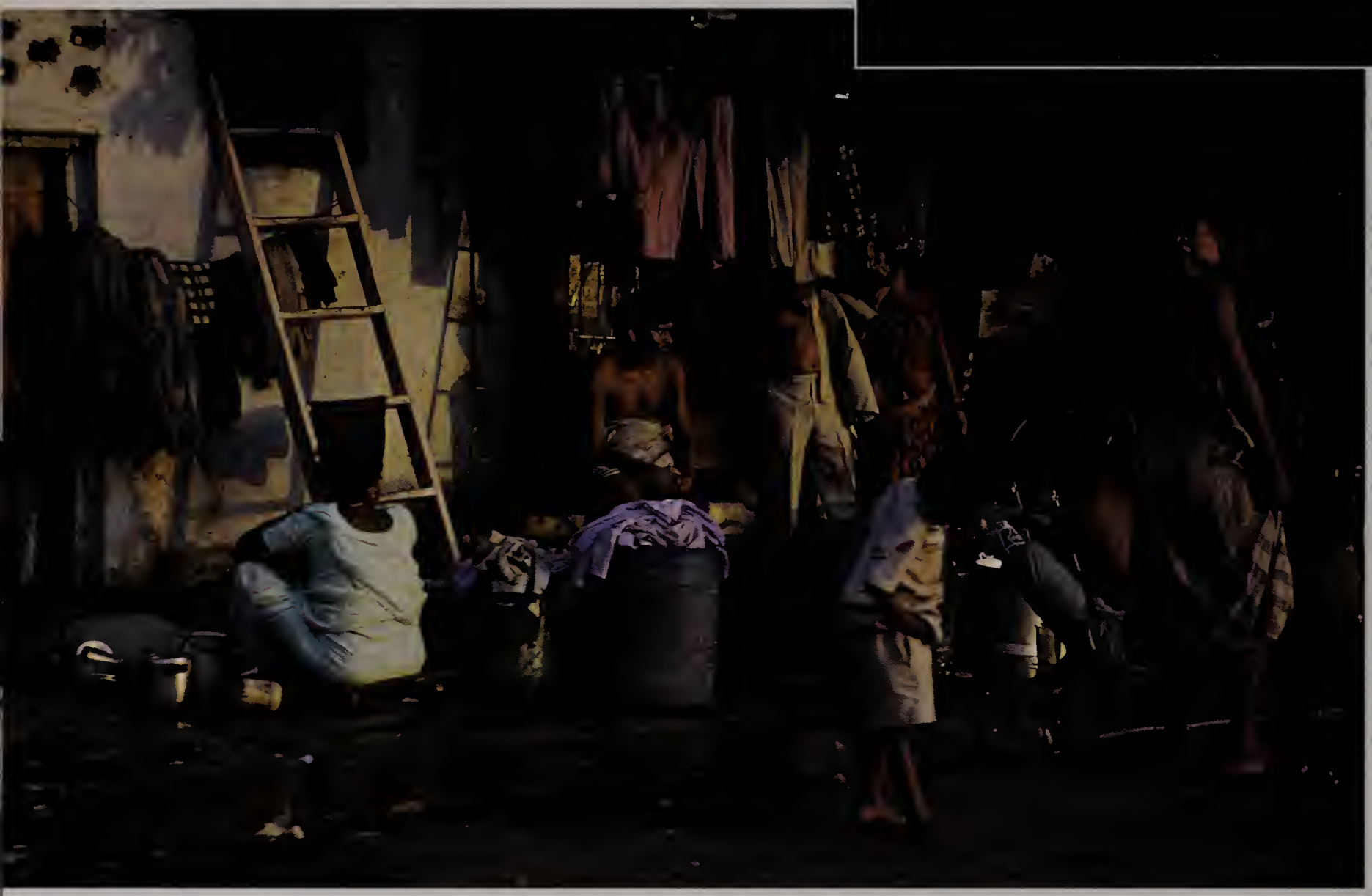

traffic-clogged streets and street marke

TOP: The Vidhana Soudha houses Karnataka's secretariat and state legislature. **MIDDLE:** Milling about on the streets. **BELOW:** Bangalore's version of a public water supply.

CIO PERSPECTIVES

Without Boundaries:

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Could IT have prevented the largest, most expensive, most complex public works project in the history of the United States from becoming a byword for poor and possibly felonious project management?

BY MERIDITH LEVINSON

THE MONEY

The Big Dig will put a big tunnel under Boston and a bigger hole in tax payers' wallets.

PHOTO BY STOCK BOSTON/BILL HORSMAN

PIT

Reader ROI

- Find out why good project management means more than just good IT
- Read about the technology that helps track monster projects
- Find out where the Big Dig went wrong

THE STORY BROKE ON FEB. 1, 2000: the Big Dig was not just over budget, it was wildly, insanely, frighteningly and perhaps feloniously over budget. The front-page headline in the *Boston Herald* read: "Big Cost of Big Dig Could Grow by $1.4B."

The "B" was for billion.

People were outraged; no one was surprised.

The Big Dig has been a fact of Boston life for almost a decade. Since ground was first broken in 1991, the city has been torn up, dug up and burrowed under. The Central Artery/Tunnel Project (the Big Dig's official name) was designed to replace the old six-lane, 1.5-mile elevated Central Artery (see "Big Dig at a Glance," Page 220). When it opened in 1959, the Artery was supposed to accommodate 75,000 vehicles a day. Today, more than 190,000 motorists from Boston's northern and southern suburbs sit in hellish traffic for up to 10 hours, Monday through Friday.

When the Big Dig is completed (target date: 2004), the elevated highway that has divided neighborhoods, scarred the city and hidden the waterfront for over 40 years will be gone, replaced by an eight-to-10-lane expressway running beneath the streets of Boston. There will also be a tunnel underneath the Fort Point Channel, another beneath Boston Harbor, two bridges over the Charles River, and 27 acres of public and commercial space where the Artery once stood. (For details on what's being constructed, see "Angioplasty on the Artery," Page 220.)

Throughout the '90s, as Boston watched the tall cranes gather and the deep holes grow, it was obvious that an enormous amount of money was being spent. Back in 1982, Massachusetts politicians (most

famously House Speaker Thomas P. "Tip" O'Neil) lowballed the estimated cost of the project to secure funding through the federal Surface Transportation and Technical Corrections Act. The politicians said it would cost $2.2 billion. Today, the price tag is $14.1 billion—most of it coming out of taxpayers' wallets—and climbing.

In 1982, Massachusetts pols lowballed the cost of the project to secure federal funding.

Of course, that $14 billion pays for a lot. The Dig is the largest and most technologically complex public works project in U.S. history—bigger than the Panama Canal or the Hoover Dam. In the course of the Big Dig:

- 200 separate construction and design contracts will be awarded.
- 161 lane miles of highway are being laid in a 7.5-mile corridor.
- 15 million cubic yards of dirt and 2.5 million cubic yards of clay are being dug up and replaced with enough concrete (3.8 million cubic yards) to build a sidewalk 3 feet wide and 4 inches thick from Boston to San Francisco and back three times.
- 29 miles of gas, electric, telephone, sewer, water lines and other utility lines (maintained by 31 different companies) are being rerouted.
- 4,800 trees and 33,000 shrubs will be planted.
- A tunnel is being constructed 120 feet below street level; in some areas it is just 3 feet below an existing subway tube.
- A casting basin big enough to hold three Titanics was built by draining a portion of the Fort Point Channel in order to create a dry environment in which to construct the tunnel; then the basin was flooded to float the tunnel into place.
- A 1,457-foot-long cable stay bridge is being built that will come within 2-and-a-half feet of the FleetCenter (where the Boston Celtics and Bruins play).

The challenge was to do all this in the middle of an old and densely populated city

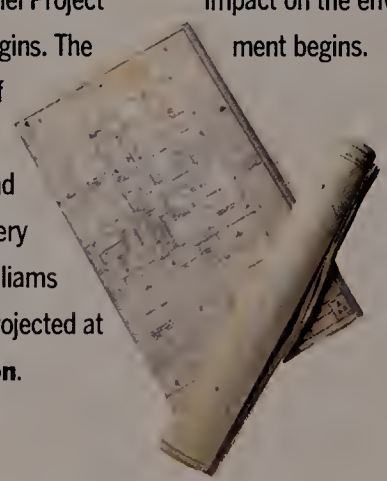
Acting Project Director *Michael Lewis says the feds changed the rules.*

PHOTO TOP BY FURNALD/GRAY

THE BIG TIMELINE | *How to turn $2.2 billion into $14.1 billion in just 18 years*

1982

Planning for the Central Artery/Tunnel Project officially begins. The total cost of the new underground Central Artery and Ted Williams Tunnel is projected at **$2.2 billion**.

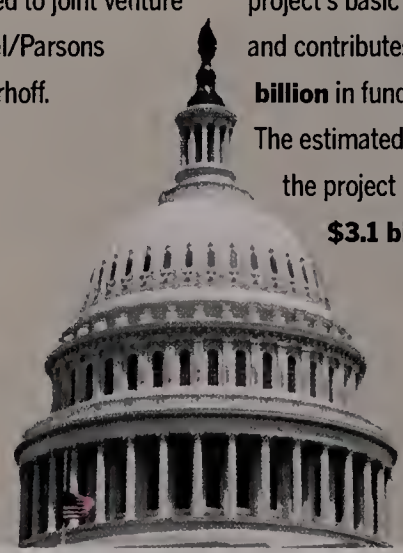


1983

Review of the project's impact on the environment begins.

1984

The Big Dig contract is awarded to joint venture Bechtel/Parsons Brinkerhoff.

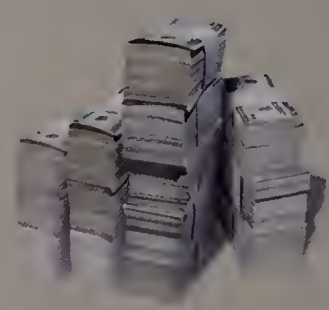


1987

Congress approves the project's basic scope and contributes **$2.5 billion** in funding. The estimated cost of the project rises to **$3.1 billion**.

1989

Project management estimates that the project will cost **$4.4 billion** and will be complete in 1998.



1990

Ground breaking ceremony. ▶

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Former MTA Chairman *James J. Kerasiotes took the heat for the overruns.*

without disrupting the subway and Amtrak trains running above the new underground highway, without exacerbating painful commutes, without driving residents nuts and without destroying local businesses. Project officials cite these necessities as the reason why the cost has skyrocketed, and, indeed, they are not lying.

Nor are they telling the whole truth.

Cost overruns are endemic to the construction business. They can result from hundreds of causes—bad weather interrupts a day's work; contractors underestimate the number of laborers for a job; soil is either harder or softer than anticipated.

IT has no power over the weather or soil. But IT can help conscientious project managers keep contractors accountable for their work and ensure that the work being done each day is in line with the master schedule and track costs. So if a contractor discovers a hidden water main, the removal of which may cause a delay or necessitate adding another crew to remove it, the project manager can adjust the schedule and the budget to compensate for the costs associated with this additional work.

"You can't take on a project that size without technological support," says Kurt Keidel, a management consultant with New York City-based PricewaterhouseCoopers. "The coordination issues are phenomenal. Technology is used to plan thousands and millions of activities on a project like this," he says.

> IT has no power over the weather or soil, but it can help project managers track costs.

Was the Big Dig's problem weak technology? Poor support?

CIO wanted to know whether a lack of IT might have been a factor in turning the Big Dig into the largest money pit in the history of the nation. What we discovered was not a lack of good IT but a lack of good project management.

Big IT

IN THE LATE 1980s, BECHTEL GROUP, THE $12 billion San Francisco-based engineering and construction giant, part of the Bechtel/Parsons Brinkerhoff (B/PB) joint

PHOTO TOP BY THE BOSTON GLOBE

TIMELINE | *Continued*

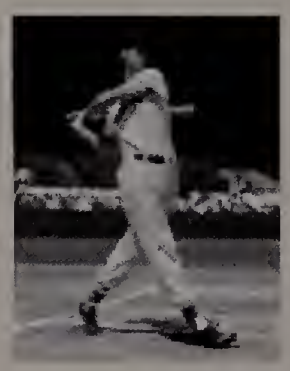
1991

Work begins.

1991

Congress passes the Intermodal Surface Transportation Efficiency (ISTE) Act that extends the federal government's financial support for the project through 1997.

1991



Construction begins on the Ted Williams Tunnel. The cost of the project is now projected at **$5 billion.**

1991

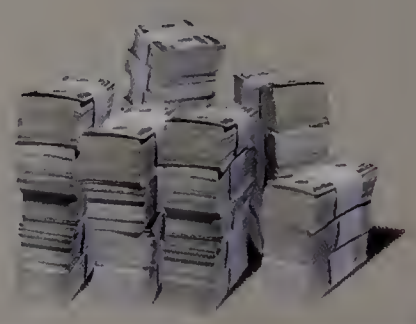
Articles in *Boston Magazine* report the Big Dig's cost at **$6.4 billion.**

1995

Ted Williams Tunnel, which cost $1.9 billion, opens on Dec. 15. Reports of the total cost of the project now range between **$8 billion** and **$9.6 billion.**

1996

The General Accounting Office (GAO) sets the total cost of the project at **$10.4 billion.** ▶



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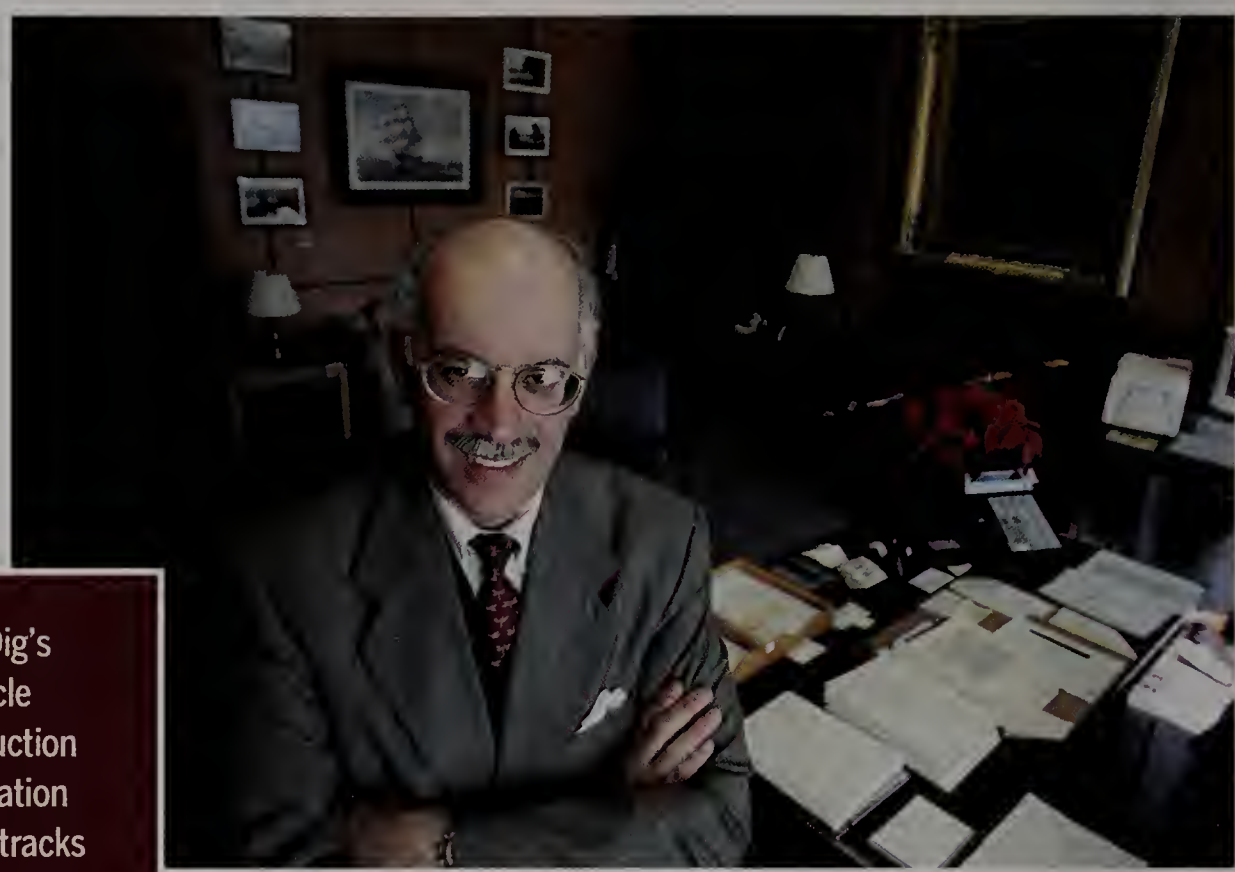
venture overseeing the construction on the Big Dig, developed Synergy, an application specifically designed to manage the Dig's finances. Synergy evolved into the Dig's Oracle Construction Information System (CIS), which was developed from 1991 to 1995 after construction began, according to Peter M. Zuk, the Big Dig's former project director. (Zuk is now vice president of global construction for Level 3 Communications in Denver.)

The CIS consists of an Oracle database and software from Primavera Systems, Timberline Software Corp. and Microsoft Corp., as well as a procurement tracking system developed by Bechtel in-house. The database runs on an Alpha server with 2GB of RAM and 13 hard drives with 210GB of storage. The Oracle CIS handles every aspect of the project including requests for information, changed orders, submission of design specs, accounting, budgeting, engineering, forecasting, reporting, scheduling, staffing, tracking and procurement. During peak construction, it processes $3 million worth of work every 24 hours.

The Dig's Oracle Construction Information System tracks 150 separate contracts.



MTA Chairman *Andrew Natsios took over the project this summer.*

"We looked at off-the-shelf software packages, but because the project is so big—and because so many constituents are involved—we found they weren't robust enough to handle the specific needs of the Big Dig," says Bechtel's Walter J. Erb, who came aboard the project as IT manager in 1995. "One contract can have 14 funding sources," says Robert Norman, Bechtel's MIS supervisor, who worked on developing the Oracle CIS. "It's impossible to use an off-the-shelf package. There is nothing in the world that will cope with the vulgarities of a project this size," he adds.

The CIS tracks the Big Dig's 150 separate construction contracts and 50 to 60 design contracts, which are funded by 20 different sources. The two primary sources of funding are the federal government, as represented by the U.S. Department of Transportation Federal Highway Administration (FHWA), which has ultimate oversight of the project

PHOTO TOP BY THE BOSTON GLOBE

TIMELINE | *Continued*

1996

The federal government commits **$4.1 billion** of the **$4.7 billion** total it has set aside for the project.

1998

In June, Congress passes the Transportation Equity Act for the 21st Century, which grants Massachusetts approximately **$520 million per year** (approximately **$310 million** dollars less than the funding provided under the ISTE Act of 1991) for highway projects through fiscal year 2003.

1998

In December, Peter Zuk resigns after a seven-year tenure as project director for the Big Dig.

1999

Four-lane Leveritt Circle Connector Bridge over the Charles River opens.

2000

The federal government has issued **$5.8 billion** in funding to date. On April 11, Massachusetts Governor Paul Cellucci fires former Chairman of the Mass Turnpike Authority James Kerasiotes for hiding cost overruns. Andrew Natsios takes control of the project.

2000

The July audit sets the cost overruns at **$2.1 billion**. The cost of the project is now set at **$14.1 billion**. ▶

PHOTOS FAR RIGHT, FAR LEFT BY VITO ALUIA

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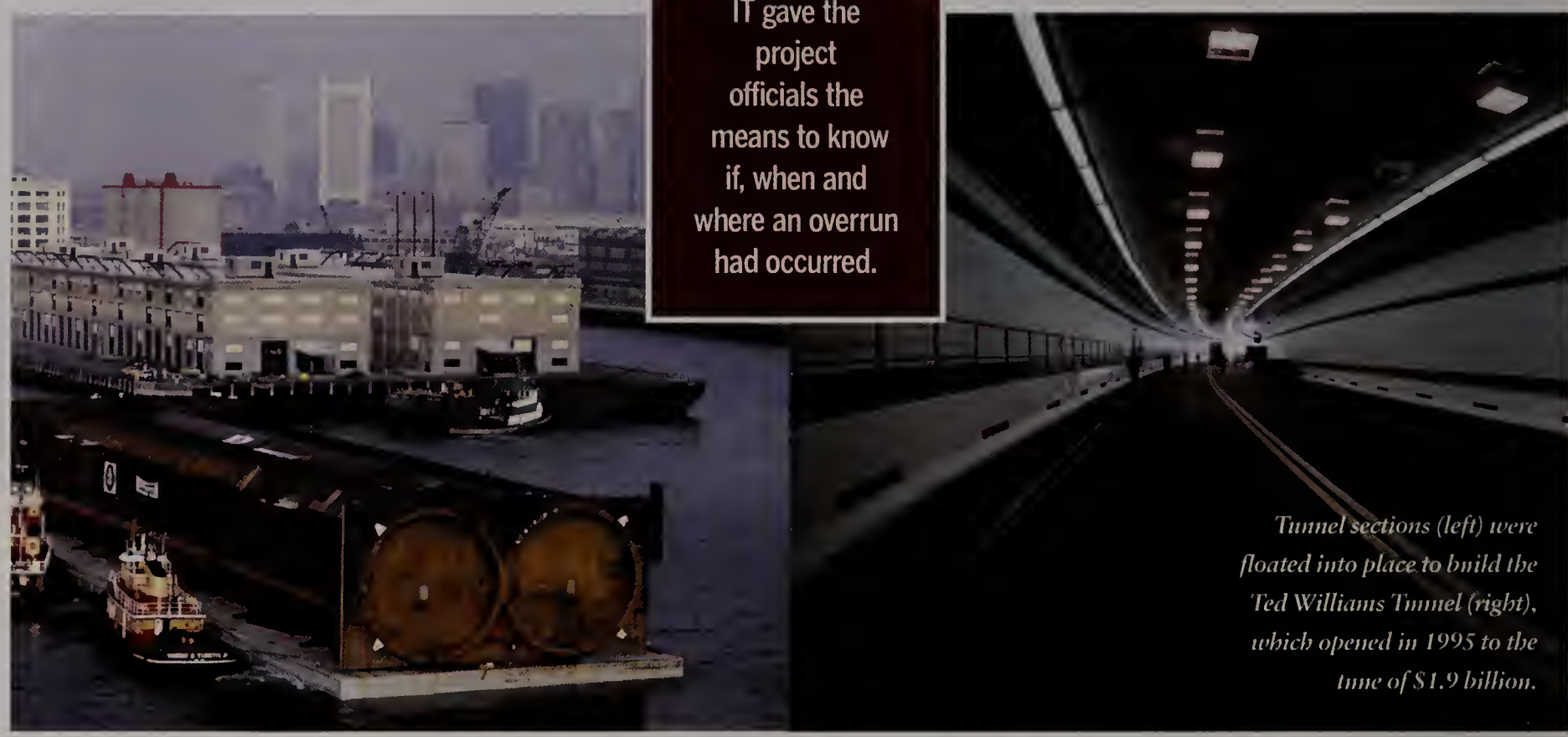


IT gave the project officials the means to know if, when and where an overrun had occurred.

Tunnel sections (left) were floated into place to build the Ted Williams Tunnel (right), which opened in 1995 to the tune of $1.9 billion.

PHOTOS TOP LEFT TO RIGHT BY PETER VANDERWARKER, AP/JAY MALONSON

and is covering as much as 70 percent of the $14 billion cost, and the Commonwealth of Massachusetts, which is kicking in the remainder. Thomas C. Arcand, CIO of the Massachusetts Turnpike Authority, which is in charge of overseeing B/PB, says that the financial data identifying which organization funds which portions of the project is kept separate in the system for auditing purposes so that officials can track the funding as it progresses. So, from the time CIS was first introduced in the mid-1990s, project managers have received regular reports on what was being spent compared with what was originally bid for each of those 150 construction contracts, of which 30 or more proceed simultaneously.

And, according to the project officials, the system worked.

Erb says, "The Oracle database was instrumental in keeping track of where cost overruns were and giving good indications as to where reductions could be made. At anytime you can run a report [from the Oracle CIS] to see where we are cost-wise."

Former Project Director Zuk says, "The information system gave accurate scheduling and cost information from which we could make decisions about whether or not to accelerate contracts to avoid slippage on [project] milestones."

And Acting Project Director Michael Lewis, who has worked on the Dig since 1992 and previously served as the deputy project director, says that project managers use the information system to determine

TIMELINE | *Continued*

2002

The extension of I-90 (the Massachusetts Turnpike) to the Ted Williams Tunnel is completed. The northbound lanes of the underground Central Artery begin carrying traffic.

2003

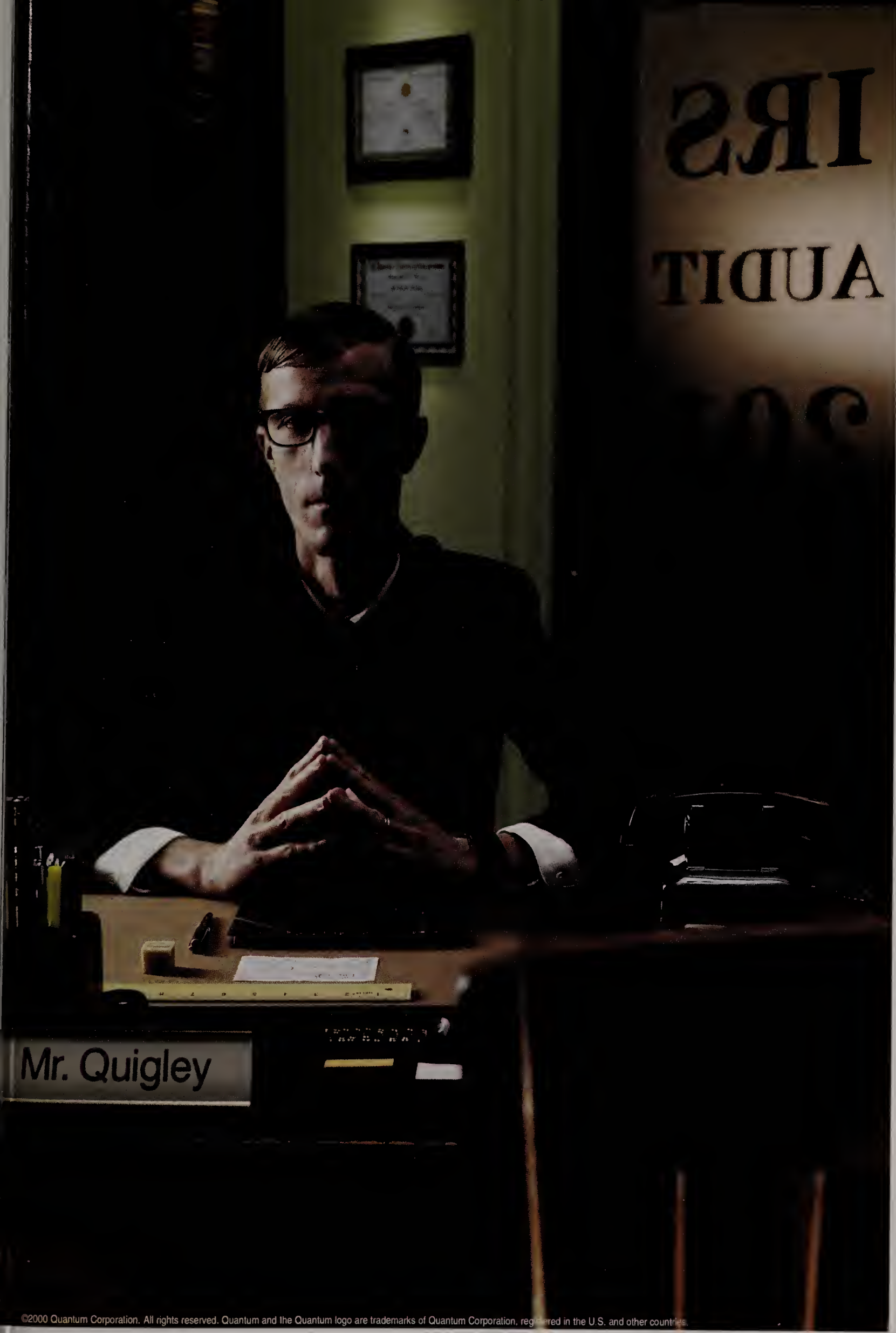
The southbound lanes of the underground Central Artery open.

2004

The project concludes with the demolition of the old Central Artery. Boom!

This cable stay bridge will funnel cars south beneath the streets of Boston and north to the suburbs.

GRAPHIC COURTESY OF THE BIG DIG



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how certain problems may affect the critical path schedule and how to readjust the schedule if necessary.

What this all means is that project officials should have known if, when and where an overrun had occurred.

And, in fact, they did.

Fuzzy Math

EVEN BEFORE THE FIRST SHOVEL WAS THRUST into the ground, the estimate for the Big Dig had already far exceeded the original 1982 $2.2 billion figure, according to reports from the state Office of the Inspector General (OIG), the Massachusetts Office of the State Auditor, the federal General Accounting Office (GAO) and the FHWA. When construction began in 1991, the cost of the project was projected at $5 billion. And the estimates escalated each year, as revealed in each new report issued by the state, the GAO and FHWA. (See "The Big Timeline," Page 210)

There didn't seem to be any limit to how much the Big Dig might cost. Between 1991 and 1994 the estimates rose from $5 billion to $9.6 billion. The money pit was beginning to assume epic proportions, and the Chairman of the Massachusetts Turnpike Authority James J. Kerasiotes decided to do something about it. In 1994 Kerasiotes, a political appointee of then-Governor William F. Weld, declared that the project's budget would be capped at $10.8 billion—or merely five times the original estimate.

Kerasiotes ordered that any new costs would have to be balanced against reductions in the original construction specs. According to Acting Project Director Lewis, "If there were any cost increases, the project had to find a corresponding cost decrease to keep the budget at cost neutral."

For example, to compensate for new

Tracking the World's Biggest Project

How the Big Dig's IT was supposed to work

Robert Norman, Bechtel's MIS supervisor who helped develop the Big Dig's Construction Information System (CIS), explains how the system can track everything from the date a contract is first advertised for bid to when a contractor is paid.

Before a contract is even put on the market for companies to bid, project officials estimate the cost of the contract using Timberline software. Once officials accept a budget for the entire project, it is loaded into the budget control module of the Oracle CIS. They add any changes that they anticipate may come up in the course of executing the contract to the trending module.

Once the project receives all the bids for a given contract, the bid data is uploaded to the Oracle CIS, which produces documents summarizing each bid. The state then awards the winning contract, and the contractor's bid is loaded into the commitment module.

Boston Mayor *Thomas M. Menino (right) gets a site tour..*

PHOTO BY AP/MICHAEL DWYER

As soon as the contract has been awarded, the contractor and the joint venture draw up submittals for what materials need to be furnished and when they need to be supplied. At this stage, costs can begin to diverge from the original bid.

Projecting the cost of potential changes in the scope of a contract, which the trending module enables project managers to do, is an important way to maintain control of its overall cost. Toronto-based Julian Giacomelli, an independent management consultant who has worked on several construction projects, says that contractors traditionally bid low because they know there will be a lot of changes in the scope of a project. These changes mean extra work and a way for them to increase their profits.

One of the major causes of delay on the Big Dig has been change orders resulting from unforeseen conditions that range from coming across utility lines that weren't on maps to discovering hidden archaeological sites to finding unexpectedly soft soil in East Boston and South Boston. Surprises like these necessitate changes to reflect having to add and pay for additional crews who, as Giacomelli says, can demand higher margins. In the case of the soft soil, construction crews had to figure out a way to freeze and solidify the earth so that they could dig the Ted Williams Tunnel through it. This delayed the opening of the tunnel and cost an additional $19 million.

Field engineers are required to inspect work to make sure it's getting done and to keep daily logs of all the activities on each site. The CIS contains a module in which field engineers can record the weather, the number of laborers on the job, and the equipment and materials used. These reports, of which there are 115,000 in the CIS, help determine the amount contractors are paid. Payments are made to most contractors every two weeks and are based on the work they finish. The pay estimate system determines which of the 20 different sources are funding this particular contract and, for the most part, makes certain that those funds are directed to the appropriate contractor. *–M. Levinson*

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expenses, Kerasiotes decided that the tiles on the walls of the Ted Williams Tunnel would not go from the bottom of the floor to the tippity-top of the ceiling; they would cover only two-thirds of the walls. According to the Dig's public affairs office, that would save $25 million.

With Kerasiotes's edict, everyone heaved a sigh of relief. Matters were now under control, and the money pit faded from the public's consciousness as Bostonians focused on traffic jams and wondered at the gaping excavation sites opening like sores around the city.

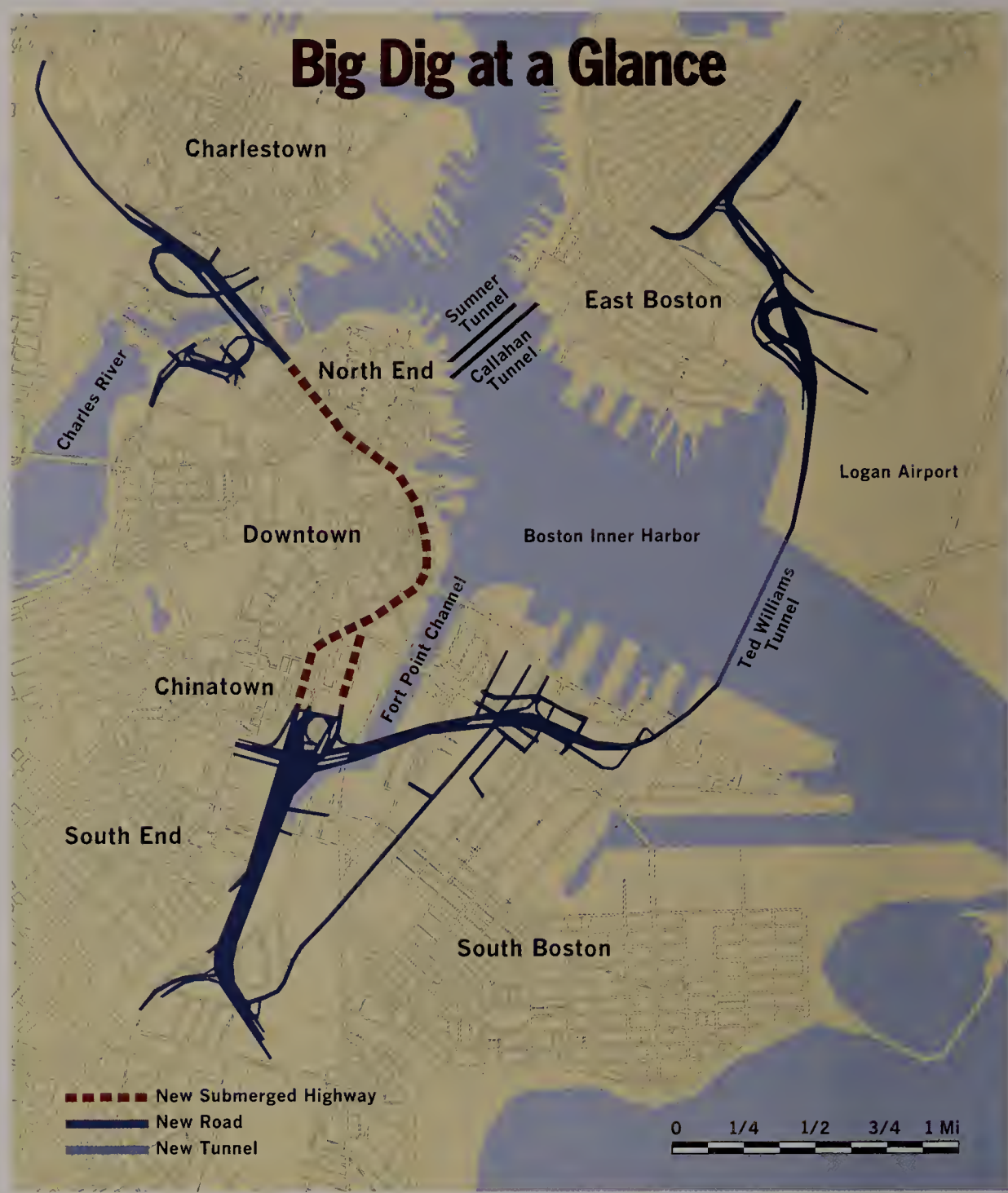
But the Big Dig's finances did not fade from the screens of various state and federal inspectors, auditors and investigators.

Boston, We Have a Problem

THE MASSACHUSETTS OFFICE OF THE STATE Auditor issued a series of 10 reports from Nov. 1, 1989, to Dec. 31, 1999, chronicling oversights in the design of the Fort Point Channel tunnel, which in 2002 will connect the Massachusetts Turnpike with the Ted Williams Tunnel. Out of a total of $288 million that the auditor identified as "unnecessary, excessive and avoidable project costs," he attributed $19 million to inadequate management oversight in the design of the tunnel, which led to costly delays. The report blamed B/PB for not providing engineering and design reports to its subcontractors in a timely manner and for not heeding their advice on the design of the tunnel. The report also blamed the Commonwealth of Massachusetts for failing to manage B/PB.

Michael Bertoulin, Bechtel's milestone manager of the Fort Point Channel portion of the turnpike extension, blames subcontractors for failing to provide complete information other contractors needed to complete their own engineering and design reports. He also says the subcontractor's suggestions for changing the design of the tunnel would have been too time-consuming and costly.

(Bechtel's public affairs department told *CIO* that Matt Wiley, project program manager for the Central Artery/Tunnel Project, would not be available for comment.)



Angioplasty on the Artery

The operation to unclog Boston traffic

The Central Artery/Tunnel Project will replace the existing Central Artery (right) with an eight-to-10-lane underground expressway directly beneath the existing road. The expressway, which is intended to accommodate 245,000 vehicles a day (as opposed to the Central Artery's 75,000), will terminate in the north in two bridges with a total of 14 lanes over the Charles River.

The elevated Central Artery, long considered the city's biggest eyesore, will be replaced by 27 acres of public and commercial space.

The Mass Pike (I-90) will be extended from its current terminus near South Station via a tunnel (the now complete Ted Williams Tunnel) beneath Boston Harbor connecting South Boston to Logan Airport in East Boston. *–M. Levinson*

PHOTO BY AP/SUSAN WALSH, MAP BY ALAN KIKUCHI

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The tunnel under the Fort Point Channel will extend the Massachusetts Turnpike to Logan Airport

PHOTO BY AP/JOHN CETRINO

The Massachusetts OIG also issued a series of reports from 1993 through 1999; it identified compliance problems with state regulations, unclear contract specifications and a continuing failure to apply rigorous cost containment measures on contracts as contributors to the massive cost overruns.

A 1997 report from the GAO suggested that the finance plan that the project had submitted to the FHWA in 1996 did not provide adequate information to assess the Big Dig's ultimate cost. The GAO recommended that the state secretary of transportation include in a new finance plan "a revised estimate of the project's costs and funding needs that more closely reflects the state's actual experience with its cost containment program and a contingency plan for financing the project if costs increase further or if the sources of financing are not sufficient."

The GAO was neither content with Kerasiotes's budget cap nor his cost-containment strategies.

Translation: The GAO was neither content with Kerasiotes's budget cap nor his cost containment strategies. The GAO wanted to know more. It wanted the specifics of when and where increases and reductions were being made.

The GAO didn't get them. The finance plans that the Big Dig submitted for fiscal years 1998 and 1999 did not satisfy the GAO. Nor in the government's view did they comply with federal law that requires that the plan provide a detailed estimate of the cost to complete the remaining elements of the project, including reasonable projections of future cost increases. According to a draft report from the U.S. Department of Transportation's Office of Inspector General dated Oct. 7, 1999, the 1998 finance plan "did not disclose significant cost information about the project, such as construction cost increases or that contract awards were exceeding budget."

is it:

true

false

both

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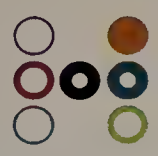

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The annual finance plan for 1999 that was submitted two months late on Jan. 7, 2000, didn't include this information either. There also was no indication in this plan of a potential cost overrun, according to an FHWA report.

In spite of the fact that the CIS tracked all this information, project officials did not provide these specifics in the finance plans that they submitted to the GAO and the FHWA.

Then, on Feb. 1, 2000, Kerasiotes, reportedly fearing an account in the Boston press, launched a preemptive strike by informing the media of a potential $1.4 billion cost overrun beyond his $10.8 billion cap. According to the FHWA, the state had not forewarned the FHWA of a potential cost overrun of such magnitude "in any document provided to the division office, in the [finance] plan or in discussions prior to the conditional acceptance of the plan."

(Kerasiotes has declined to respond to the FHWA charges, telling *CIO*: "Since April 11, I haven't had any comment on the project or the issues raised, and I'm not going to change my course at this point.")

Because of the sudden news of the overrun, the FHWA established a multidisciplinary federal task force to analyze the oversight of the project.

The task force found that the FHWA, which is responsible for ensuring that tax dollars going to this project are used responsibly and lawfully, failed to fulfill its oversight role. It also concluded that senior management of the Big Dig had evidence of the $1.4 billion overrun prior to submitting their finance plan on Jan. 7, 2000, and that project officials intentionally withheld this knowledge.

The task force recommended a change in the financial review process and in the delegation of authority for accepting the finance plan. It concluded that the existing methods of reporting the status of the project, a report called the "Project Management Monthly" (PMM), didn't provide

The federal task force concluded that Big Dig management withheld information about the overruns.

A typical day on the Central Artery

PHOTO BY THE BOSTON GLOBE

The First Mistake

Why the Central Artery never worked

Today, more than 190,000 vehicles sit in traffic for up to 10 hours a day on the Central Artery, the stretch of Interstate 93 that cuts through downtown Boston. In spite of the fact that Massachusetts was ranked as the safest state in which to drive in a survey conducted in 1999 by the National Safety Council, four times as many accidents take place on the Central Artery than on any other urban interstate in the country. This is because the Central Artery, which was designed in 1948 and constructed in the 1950s, was intended to carry 75,000 automobiles a day.

In the beginning, the Central Artery was conceived of as one-half of a citywide transportation system designed to accommodate the post-World War II influx of cars that was beginning to jam Boston's notoriously narrow and winding streets. The system consisted of the Central Artery and the Inner Belt. The elevated, six-lane Central Artery (three lanes stretching north and three lanes going south) was meant to serve local traffic with 27 on- and off-ramps along a 1.5-mile stretch of road. The Inner Belt, which would bypass downtown Boston by running through the South End and the Back Bay, would accommodate through traffic.

But the Inner Belt was never built. After more than 20,000 residents lost their homes and 1,000 structures were demolished during nine years of construction on the Artery, citizens who would have been affected by construction of the Inner Belt vehemently opposed the project.

So the woefully inadequate Central Artery stands today, with cahs pahked bumpah ta bumpah (translation: cars parked bumper to bumper) along its cracked and crumbling surface, doing double duty: distributing traffic throughout downtown Boston and funneling it to points north and south.

–M. Levinson

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Tunneling under the existing elevated Central Artery (left); construction on the 14-lane cable stay bridge (center and right).

Investigations have been launched into the Dig for fraud, corruption and administrative violations.

"a clear, accurate and timely picture of the total potential project cost exposure or cash flow needs."

Lewis says that after the project was assessed in late 1999, the FHWA changed the requirements for reporting the project's finances, and subsequently the accounting system had to change. As it had done under Kerasiotes, the state could no longer apply insurance credits to the finance plan, nor could it employ its cost containment system that had concealed where extra costs were being incurred. Instead, all project costs would have to be identified.

Fixing the Hole

TWO MONTHS AFTER THE $1.4 BILLION overrun made headlines, Massachusetts Governor Paul Cellucci fired Kerasiotes.

"The governor has acknowledged that one of the mistakes that Mr. Kerasiotes made was that he was not more forthcoming with federal officials," says John Birtwell, Cellucci's press secretary. "When the feds came in," he continues, "they determined that there was a breakdown in communication between their own officials and state officials." Birtwell says that the feds removed some of their own people and asked the state to do the same. "The problem was at the Artery," says Birtwell, "and the problem was removed."

Now the project is the responsibility of former State Finance Secretary Andrew Natsios.

Natsios's first order of business was to get the project's finances straightened out. The state hired Deloitte & Touche to conduct a series of independent audits that, as of August, have fixed the cost of the project at $14.1 billion. The state has also worked to improve communication and reporting procedures by enhancing the PMM, holding quarterly review meetings with senior executives and national FHWA officials, and conducting its own bottom-to-top assessment of the remaining project costs every six months.

THE BIG DIG HAD THE TECHNOLOGY TO IDENtify the outrageous cost overruns that have now made it the most expensive and controversial construction project in U.S. history. The problem was not so much that they incurred these staggering costs (though that's clearly an issue with taxpayers and the Commonwealth of Massachusetts, which has to cough up extra funding), it's that project officials didn't communicate the information about the overruns to the FHWA. If they had, the state probably wouldn't be embroiled with the FBI, the Securities and Exchange Commission (SEC), the U.S. Office of the Attorney General and Massachusetts Attorney General Tom Reilly's office. All have launched investigations into the Dig for fraud, corruption and administrative violations. The IT that was designed to track the project's cost and schedule is now being used to pinpoint exactly who knew about the overruns, what they knew and when they knew it.

If there's a lesson to be learned from the sordid tale of the Big Dig, it's this: Report problems as they occur; report them accurately and truthfully. It is, as Shakespeare said, "a tangled web we weave when first we practice to deceive."

And an expensive one, too. CIO

Staff Writer Meridith Levinson observes the progress on the Big Dig on her way to *CIO* every morning from her home in South Boston. E-mail her at *mlevinson@cio.com*.

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A Canadian workers' comp bureau moves from a data disaster to stored and shared knowledge

BY ANGELA GENUSA

Chaos Theory

The Organization: The Workers Safety and Insurance Board

Founded 1915 **Location** Toronto **Employees** 5,000 **1999 premiums revenue** $2.7 million **1999 benefits expenses** $2.4 million **KM challenge** How to harness and use knowledge for the benefit of front-line service delivery teams, staff, customers, clients and health-care providers **URL** www.wsib.on.ca

IF THERE WAS EVER a textbook model for a worst-case knowledge management scenario, it would have to be the über-bureau featured in Franz Kafka's novels. Drawn from his experience working at a workers' compensation agency, Kafka's fictional bureaucracy was an institutional nightmare of incomprehensible information, lost files and maddening dead ends. While Kafka toiled on his 1914 novel, *The Trial*, lawmakers a continent away in Toronto were creating what is now known as the Workers Safety and Insurance Board (WSIB), a government-owned, employer-funded workers' comp agency. As recently as a decade ago, calling the WSIB "Kafkaesque" would have been an apt reference.

The WSIB administers the province's workplace insurance and provides disability benefits to injured workers, serving more than half of Ontario's 6.2 million workers employed by approximately 182,000 businesses. Its employees use or exchange information from many sources, including employers, workers, health-care providers, occupational health and safety associations and WSIB coworkers. Unfortunately, finding even the most basic information meant sorting through a hodgepodge of octogenarian paper files, byzantine computer systems and voice-mail mazes.

Take, for example, a simple question from one of the companies that underwrites for the WSIB. "Let's say an employer called in and said, 'I didn't pay my dues last month. How much do I owe?'" says WSIB Knowledge Manager Ash Sooknanan. "You'd have to go and look at 28 different screens and seven or eight different applications. You'd have to log in and out of each system, print out or copy the information you needed, put it into a spreadsheet, tally it up and respond. In many cases it took days." But in 1997, the WSIB rolled out a knowledge management (KM) system that efficiently gathers, stores and

"If you could understand why a decision was made, you wouldn't have to continually revisit your choices."

–VALERIE ADAMO, CIO, WORKERS SAFETY AND INSURANCE BOARD

PHOTO BY PATRICK NICHOLS

processes the reams of information that flow through the agency and lets the WSIB's 5,000 employees easily draw on this stored cache of knowledge. With its new KM program, the board hopes to close the book on any future Kafkaesque allusions.

Time Savers

For a culture so thoroughly entrenched in bureaucracy, it's surprising that the WSIB's KM initiative began as a grassroots effort by a handful of IS employees. Its aim: to compress the time it took to deliver projects. "[At the time] it was a very practical idea—just get the darned things delivered faster," says Valerie Adamo, CIO and vice president of IS.

Faster delivery was crucial because "turnaround time" was almost an oxymoron for the IS group.

Take the task of writing a date routine: A simple computer program was designed to analyze a worker's compensation claim based on the date it was filed and helped determine the injured worker's eligibility and benefits. Programmers had to painstakingly hand-code the routine and transfer information from dozens of hard-copy manuals—a process that could take two weeks. Add four weeks for unit, system and acceptance testing, and a date routine could eat up six weeks of valuable time. And since programmers were unaware of what other

projects IS employees were working on, it was difficult to know whether coworkers had information that might help save time. "The left hand didn't know what the right hand was doing," says Sooknanan, "and you could extrapolate that to the entire organization."

Under growing pressure to respond more rapidly to problems and improve its customer service, the IS department formed a rapid accelerated development (RAD) branch in 1994. The group used an approach called time boxing: completing application development projects in phases—from thought to installation—in nine months. Delivering products to customers faster called for finding new ways to gain efficiency, so the group came up with the concept of gathering harvestables—documentation of previous projects that programmers could refer to when writing application code. Adamo reduced time spent on analysis when creating code from scratch by training IS employees to first look for existing information, such as application code that had already been tested and proven so that they could simply copy and revise it. Thus, writing a date routine could be completed in a couple of hours instead of six weeks.

The idea proved practical, and the RAD group's selection of intellectual capital soon expanded from application code to include best practices, project templates, customer-selection criteria, standards and guidelines. The group then built a rudimentary Lotus Notes database to house this growing collection. New challenges quickly arose, however. IS employees found it difficult to reuse an item from the repository without consulting the creator for one thing. And IS project team members focused so intensely on the customer during projects that it was difficult to find face-to-face time to exchange knowledge with other IS workers.

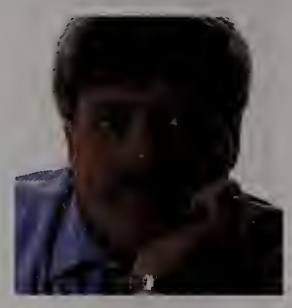
The RAD group solved these problems by building TeamWorX—a virtual team environment based on Lotus Notes. The tool vastly decreased the learning curve and recursive work of new team members and

EXPERT ANALYSIS BY TOM DAVENPORT

Smart Idea—Recycling

As long as we're talking about Franz Kafka, do you think that the Insurance Institute in Prague knew about his observational and writing skills? Could it have applied his expertise more effectively, say to writing marketing brochures or at least the corporate personnel manual? Sort of a knowledge management problem, don't you think?

In business today, familiar ideas and phenomena are apt to crop up in new contexts. Knowledge management in general is one of those ideas. Certainly the notions of reusing intellectual capital, writing down your experiences and sharing your knowledge have all been with us for a while. But I must confess that I hadn't heard of the old chestnut of programming code reuse as an example of knowledge management. Of course it is knowledge management, and the Workers Safety and Insurance Board (WSIB) is smart to figure that out. Putting the code and documentation in Lotus Notes makes it somewhat easier to store and access, but the fundamental principle is no different than when the repository was the tape library in the computer center.



Tom Davenport is director of the Andersen Consulting Institute for Strategic Change and a distinguished scholar in residence at Babson College. He can be reached at *davenport@cio.com*.

Another time-honored idea that's been profitably recycled by the WSIB is the project notebook. In the old days, people working on projects of various kinds—most commonly product-development projects—would write up their decisions, observations, learnings and so forth in notebooks (actually, I believe project binders is a more apt term). These were put on the shelf for later generations of project managers and workers to peruse. I know of some cases, primarily in Japan, where project notebooks are religiously consulted before starting a new project. On this continent most workers are somewhat less religious about learning from the past whether its lessons are recorded on paper or in electronic repositories.

WSIB CIO Valerie Adamo is dead right that the primary issue with reusing existing knowledge is culture, not technology. Most technical people avoid knowledge reuse primarily because they don't get much credit for it and were never trained to do it in school. In Computer Science 101, it would have been considered cheating to start with an existing program that somebody else wrote and modify it for your own purposes. Adamo and her IS organization realized that the reward structure needed to be changed to reward speed and reuse. My only doubts about this case are whether the somewhat miraculous cultural changes it describes could be achieved so easily and quickly—usually it takes years and some pretty major changes in management attitude and reward structures.

Assuming that the culture of the IS organization has successfully been changed to value knowledge reuse, the next challenge for the WSIB is to change the entire organization's culture in this direction. And if that weren't enough, what about the culture of the WSIB's customers? Wouldn't it be great if they could use the WSIB knowledge to avoid disabling accidents in the first place? Franz Kafka would turn over in his grave if he saw that happen.

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allowed them to get up to speed on an entire project in a couple of days by simply following and reading discussion threads. IS teams also began using TeamWorX to record how and why they had made decisions.

"What became very obvious to us was that if you could understand why a decision was made, you wouldn't have to continually revisit your choices," Adamo says.

TeamWorX paid off for IS. The WSIB saved approximately $1.5 million in one year by cutting the time spent on communication, according to a 1997 internal survey comparing the percentage of employees' time spent on communication activities before and after TeamWorX was implemented.

Building TeamWorX was easier, however, than getting IS employees to share knowledge, ask questions and reuse intellectual capital. "Somehow we had to understand that asking for help did not make us stupid and didn't make us ineffectual. In fact, asking the question made us extremely effective because it meant that we could stop making things from scratch all the time," says Adamo.

The new KM tools also challenged the general belief in the IS department that the person who can solve the problem is a hero, she says. "We had to change the model so that the guy who delivered fastest was the star," she says. "And the only way to be the fastest was to reuse things."

IS management reinforced the new cultural assumptions by rewarding those employees who used the new tools to quickly produce weekly deliverables that could be demoed for customers, created harvestables or enhanced the reusable objects.

"The left hand didn't know what the right hand was doing."

–ASH SOOKNANAN, WORKERS SAFETY AND INSURANCE BOARD KNOWLEDGE MANAGER

PHOTO BY PATRICK NICHOLS

Spreading the Word

TeamWorX turned out to be contagious. When other departments, such as HR or billing and collections, worked with IS team members on projects, they got a glimpse of TeamWorX and the knowledge bases. Those departments soon began clamoring for the tools, Adamo says. "As [internal customers] started to leave the project envi-

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ronment and go back to their regular workstations and business environments, lo and behold, they found uses for both TeamWorX and the knowledge bases. They basically staged a little revolt to be able to take it with them." As the tools grew in popularity, senior management came to understand their value directly from the staff. "At that point, we took it right across the corporation," Adamo says.

As the tools spread, the system evolved into a companywide intranet-based tool called the intellectual capital knowledgebase. The three-tier client/server application sits on a Lotus/Domino platform using Windows NT workstations connected to both OS/2 and mainframe servers. The intranet provides a user interface that accesses data from Notes databases and also provides e-mail for workstations.

The Notes databases and forums include:
TeamWorX: information for teams and work groups, including correspondence, meeting minutes, tasks, status reports and forums for team communication and collaboration.
Accelerated solutions knowledgebase: information for departments, including departmental methods and procedures for security, revenue and pricing.
Staff empowerment and enabling knowledgebase: information for all employees, including human-resource policies and procedures.
Knowledge capital knowledgebase: Information for external customers, employers, workers and other stakeholders.

The system contains more than 200 knowledge bases and records, and it receives approximately 800,000 hits each month. If an employee needs information on filing a claims appeal, she can search the knowledge bases for related legislation, guidelines on how the WSIB interprets the legislation and policies for filing the appeal. She can also easily find other employees who are experts in the area of claims appeals. The WSIB management has started connecting knowledge management to performance by including intellectual capital contributions into employees' job objectives.

The WSIB plans to expand the system with an Internet-enabled application that will help front-line teams collect claims information—a project that will require supplementation with large-scale technologies such as document management and customer relationship management. The WSIB will also be looking at technologies that border on artificial intelligence to aid employees in decision making.

Kudos for the program keep arriving, including two Canadian Information Productivity awards and a silver medal in *Technology in Government Week*'s distinction awards for innovative service delivery in the provinces. One of the WSIB's visions is to position itself as a center of expertise for workplace health and safety in Canada and, eventually, the world, Sooknanan says. "While it's not our mandate to say we want to serve the world, I think that's what's going to happen if we focus on doing a job that's going to be world-class." CIO

"While it's not our mandate to say we want to serve the world, I think that's what's going to happen." –ASH SOOKNANAN

Lessons Learned

The WSIB says it has learned a lot about what works and what doesn't when implementing knowledge management (KM) systems. Here are six important tips from the agency:

One: It makes sense to think big, start small and build incrementally. For companies getting started in KM, start with a small work group, either a project team or a functional area, and develop a range of separate knowledge bases, rather than one large knowledge base.

Two: Make sure there is commitment at the team level. Managers may think they control teams, but in reality, they at best influence them. The team must understand the value of the system and support it. Without team commitment, you're finished before you even start.

Three: Keep it simple. Because KM systems are difficult to implement successfully, they should be kept as simple and easy to use as possible. Don't make them more complicated than they need to be.

Four: Promote "green hat" contributions—that is, works in progress. Knowledge creators have a natural tendency to wait to document their thoughts until they're fully formed. That's a mistake. It's far better to have people document their thoughts as works in progress so that they can benefit from the comments of others and refine their contributions over time.

Five: Do not underestimate the cultural impact. The cultural aspects are just as important as the technology that enables KM.

Six: For a KM system to be successful long term, it must be dynamic and evolving. Static knowledge bases quickly fall into disuse.

Senior Writer Angela Genusa will be happy to field questions about Kafka or even knowledge management at *agenusa@cio.com*.

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Publisher Dianne Bohmer:
"It's hard to get excited about a business plan that isn't a moneymaker."

Cincinnati Magazine wrestles with the question of online strategy

to e or not to e

BY EMELIE RUTHERFORD

In the beginning, website owners convinced themselves that it was just fine to give products away for free. As long as they lured eyeballs with compelling content or sticky apps, the theory went, they'd rake in the dough with ad revenue. Now, five years later, when having a website is no longer a novelty and venture capital money is no longer flowing freely, the give-it-away business model has been called into question.

And while many industries' webmasters have long ago accepted that advertising won't keep their sites in the black, the publishing industry still relies on it. The problem is, only those publications with big money readers and legions of sales staffs are winning. The rest are either scaling down their operations or creating sites that expand on (and

Reader ROI

- Discover options for turning a profit online
- Read how one regional publisher struggles to avoid cannibalizing its print advertising
- Learn about the current state of online advertising sales

PHOTOGRAPHY BY JOE HARRISON

stray from) their publications' editorial missions. *Cincinnati Magazine* is one example of a publication that must decide how it will enter an arena that will likely produce very little monetary returns and present a product that is probably quite unlike its print version. Should the magazine ignore the Web and save the cash, or hop on and reach a new audience while better serving its loyal readers?

Cincinnati Weighs Its Options

Cincinnati Magazine is the quintessential city guide. Locals read it to stay in tune to seasonal events, changes in the housing market and, of course, the occasional city scandal. But a Cincinnatian looking for a southern Ohio jazz club to hit on Thursday night doesn't scour the publication's calendar of events on *www.cincinnatimagazine.com*. The website doesn't exist.

Cincinnati's publisher, Dianne Bohmer, says they've simply been too busy to invest time and money in a business plan that seems unlikely to generate much revenue. The monthly publication brings in just under $5 million each year and employs a

It's a Cruel World

Numbers show that publishing online is a tough business

To date, very few publications, such as *The Wall Street Journal*, have recouped the considerable expenses of building a website by persuading users to pay to read online content. Many others, like Slate.com, have tried and failed. According to Jupiter Research, a New York City-based Internet consultancy, only 15 percent of the top 250 websites charge for content, and most of those are adult-oriented. Free, advertising-based revenue models have some prospects for success, however. Web advertisers spent $3.6 billion in 1999 in the United States alone, according to eMarketer, a New York City-based publisher of Internet statistics, and will spend as much as $21 billion in the year 2004.

According to PricewaterhouseCoopers and the Internet Advertising Bureau's New York City-based "Internet Ad Revenue" report, advertisers are spending 12 percent of these billions on new media sites. And they are funneling this money primarily into banner ads. According to the report, 52 percent of Web advertisers bought banner ads in the first quarter of 2000, 27 percent chose sponsored text agreements, 4 percent advertised in classifieds, 3 percent bought interstitials, 3 percent took referrals, 2 percent sponsored rich media, 1 percent sponsored e-mails, and 1 percent sponsored keyword searches.

The report also states that 90 percent of online advertising deals are based partly or wholly on cost per thousand page views (CPMs) or impressions, both of which are measurements of how many users click on the publishers' sites and the banner ads. But garnering these clicks is no easy game. Click-through rates—the number of users who click on the ads—have dropped from 1.4 percent in 1997 to 0.4 percent in March of 2000, according to eMarketer.

Vying for the diminishing number of clicks is an increasing number of sites. New, high-profile content sites continue to emerge, such as media maven Steve Brill's *www.contentville.com*, and those developed by publishers like London-based Reed Elsevier (parent company to the New York City-based Cahners Business Information), which recently announced that it will spend $1 billion over the next three years to bring many of Cahners' 144 trade magazines online. According to Cambridge, Mass.-based Forrester Research, 80 percent of retailers say creating and presenting content on their noneditorial sites is a top priority because it helps increase their product sales. And many of them are selling ads or hoping to start selling them soon.

"Consumer, advertiser and technology shifts are shattering the traditional media value chain," according to Forrester's report "Deconstructing Media," which predicts, "The days of predictable, packaged audiences and comfortable media dominance are waning."

Respondents to a 1998 survey by The Pew Research Center for the People & the Press, a Washington, D.C.-based opinion research group, revealed that visitors to content sites go online primarily to access weather and then (in order of frequency) information about science, health, technology and business. They are not, according to the report, hopping online to read thoughtful commentary. So publications like *Cincinnati Magazine*, which contain mainly long feature stories, may have to refocus their content strategies to survive online.

–E. Rutherford

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tight-knit staff of 23 editorial, advertising, finance, clerical and support personnel. Bohmer knows that to establish a Web presence she'll have to add more staff and dig into the magazine's coffers. She also knows there's no pot of gold on the other side of the screen.

"Magazines I know that could once sell banner ads for $700 are now selling them for $140," says Bohmer. "So when you make a business plan based on $700 ads and it's brought down to $140, you have a lot of compensating to do.... It's hard to get excited about a business plan that isn't a moneymaker."

"Magazines I know that could once sell banner ads for $700 are now selling them for $140."

–DIANE BOHMER, PUBLISHER, *CINCINNATI MAGAZINE*

Industry observers are also losing faith in the ad revenue business model. "Rates are coming down for Web advertising, and people are responding less to Web ads," says Dan O'Brien, a senior analyst for Forrester Research in Cambridge, Mass. "Advertising has become a tough model to make work. Everybody wants to be the next Yahoo, but that may be yesterday's success."

Even those publishers that may have a shot at duplicating yesterday's success in terms of luring advertisers are finding another source of revenue drying up: venture capital. APBnews.com, a breaking news website that employed such luminaries as Pulitzer Prize-winning journalist Sydney Schanberg and O.J. Simpson prosecutor Marcia Clark, folded in June, days after receiving an award from Investigative Reporters and Editors, when its third-round backers pulled their money. The venture capitalists were aware that APBnews.com's banner ad campaign, which had client cash cows such as Microsoft, wouldn't pay the bills.

But what about city and regional publications like *Cincinnati Magazine*? They have niche audiences in specific geographies. They probably can't attract high-paying advertisers, but they may be able to exploit the local market for high-end restaurant and real estate advertising. "This whole area is in a constant state of turmoil," says Jim Dowden, executive director of the Los Angeles-based City and Regional Magazine Association (CRMA). Of its approximately 77 members, only around 50 CRMA magazines have a website, and many of them simply post subscription information and their tables of contents, directing users to buy the print publication to read the stories.

Some find unique ways to get around the banner ad trap. *San Diego Magazine* (*www.sandiegomagazine.com*) gave its site a name, San Diego OnLine, that is different from the publication's and offers noneditorial services like Web hosting. But observers say that even San Diego OnLine is operating in the red. Another regional publisher, Homes & Lifestyles Publishing, a division of Englewood, Colo.-based Wiesner Publishing, sometimes sells its 12 city and lifestyle magazines sites, including *www.atlantahomemag.com*, *www.coloradofrontiers.com* and *www.stlouishomesmag.com*, to advertisers as a package deal. But Wiesner's Web Products Manager Tobi Anderson admits they haven't made money and the Web is still a threat.

"We don't have a plan to make money; we're not an e-business," says Anderson. "It's important to be on the Web, and that's why we do it." In Boston, *The Improper Bostonian,* a monthly tabloid, informs visitors to its website (*www. improper.com*) that it does not have a Web presence "because we're still trying to figure out how magazines are going to make money in this new medium once the inevitable stock market correction occurs and ridiculously overpriced dotcom companies are forced to show a profit." That profit-revealing time may be now. Business consultant Seija Goldstein, owner of New York City-based Seija Goldstein Associates, conducted a financial standards survey for CRMA in 1999 and found that, with the exception of city magazines in spots that are major tourist destinations, the typical city/regional magazine does not make money online.

In Cincinnati, publisher Bohmer, against her better judgement, still feels that she should build a website to better serve *Cincinnati Magazine*'s readers while attracting new ones. "We want the up-and-comer who's 33 to read it now, instead of at 38.... As we look at circulation, we want to skew to younger readers, and the Web generally gets younger readers." Bohmer, like Wiesner's Anderson, has reluctantly come to believe that being part of the media means being on the Internet.

And Bohmer knows that most of her magazine's readers use the Web. So why not keep their attention while they're looking at their computer monitors? Bohmer imagines a hypertext *Cincinnati Magazine* with a presentation somewhere in between *The Improper Bostonian*'s confession of bewilderment and *San Diego Magazine*'s attempt to do business that is far from the magazine's core competency. Bohmer would like to post all of her magazine's articles, as well as supplemental content that helps to package the

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print pieces. "We're known for our 'best of the city' issue," she says. "Instead of doing only the 12 best places to have dinner online, we could have an online guide that corresponds [to the print coverage]."

Kitty Morgan, *Cincinnati's* editor, is a bit more enthusiastic. Morgan thinks a website will increase subscriptions by posting subscription forms and spreading the magazine's brand. "I see [a website] as a marketing tool," says Morgan, "not as a new business that we'd launch." And this marketing tool, she believes, could serve its readers and attract advertisers by serving as an expert guide to Cincinnati.

Despite all the benefits Bohmer and Morgan recognize in a CincinnatiMagazine.com, they have not yet made the leap, largely because of Bohmer's doubts. She knows readers and advertisers like the print magazine the way it is. And so does she. "We know from feedback to our recent redesign of the magazine," says Bohmer, "in which we went from black and white to four color, from saddle-stitched to perfect binding, that people want the package. They want to pick it up, feel it, see great photography." Bohmer wonders if all of *Cincinnati Magazine*'s readers will visit a hypertext version if the articles are its primary lure.

And of course, there are also the typical concerns about cannibalization. "If people have access to our calendar of events without buying the magazine, I'll have reservations," says Bohmer. "I worry that this could affect our subscriptions."

As a publisher, Bohmer wants to run a profitable shop, but now, with Morgan's encouragement, she is finally ready to swallow her pride and go online. She has come to believe that to thrive as a business that delivers information to a paying audience, her magazine must serve those readers through all the mediums they use.

"A fax machine is not profitable," she says, "but it's necessary to do business. Rent isn't profitable, but you have to pay it to do business." Maybe a CincinnatiMagazine.com won't be profitable, maybe it will cannibalize the print product and burden its staff, but Bohmer and Morgan believe the advantages outweigh the disadvantages.

Bohmer admits that she has been approached by Cincinnati-area sites for partnerships but just can't figure out what sort of Web business strategy works. The magazine's parent company, EMMIS Communications in Indianapolis, is working on a plan for another publication, *Texas Monthly*, a plan Bohmer intends to watch and copy if it's successful. "We're holding back until we see this plan," she says. "Until that's in place, our hands are tied."

"I see a website as a marketing tool, not as a new business."

–KITTY MORGAN, EDITOR, *CINCINNATI MAGAZINE*

Strategic Advice

Three new media pundits offer suggestions as to how Bohmer can address *Cincinnati Magazine*'s online publishing dilemma.

DEFINE WHY YOU'RE GOING ONLINE

Jimmy Guterman, founder of The Vineyard Group, a media consulting group in Massachusetts that helps existing publications build websites, suggests that before *Cincinnati Magazine* shops around for Web servers and designers, Bohmer and Morgan should try to identify exactly what they want in return. "If they ask what they're specifically trying to get out of it, they can save a lot of money in terms of building it," says Guterman. "A site that is intended to increase subscriptions will look quite different from one built to lure advertisers."

Guterman says if Bohmer and Morgan decide they'll measure success by traffic, they may institute a content strategy to bring visitors back on a regular basis, such as posting content far more often than once a month. But if they hope to use the site primarily to drive up circulation, they shouldn't put the effort into creating more timely content. And if success for them means more revenue, they'll have a lot of sales pitches and partnering ahead.

CONSIDER THE CONSUMER

If *Cincinnati Magazine* hopes to reach a younger group of readers, says Guterman, it has to add new editorial features that speak to people in their 20s. City magazines, says Guterman, aren't known for speaking to young readers. "It won't work to put up the same content packaged differently," he says. "People aren't that stupid."

Fellow consultant Mark Logan agrees but thinks *Cincinnati Magazine* shouldn't rush out to hire new writers and freelancers to create the new content. Logan, a managing partner at Lookandfeel New Media, a Kansas City, Mo.-based interactive marketing and design company, says hiring a new staff would devour any increased profits. He suggests that Bohmer and Morgan should, as much as possible, steer their existing editorial and advertising staffs toward the Web.

LEARN FROM THOSE WHO HAVE GONE BEFORE

To keep costs low, Logan advises *Cincinnati Magazine* to look outside its walls for Web production tools. Because many online publishers have already undergone the pain-

You've got a responsibility to solve this puzzle...

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You've got a problem you might not even know about. As more of your organization's assets and critical business processes move on-line, your responsibilities are changing. Why? Because now you're vulnerable to a new class of threat: Cyber Attacks. Attacks that go beyond annoyance and strike at the heart of your operations. We're talking about disruption of business, damage to brand and reputation, and loss of customer data and intellectual property. Board level issues, not IT problems.

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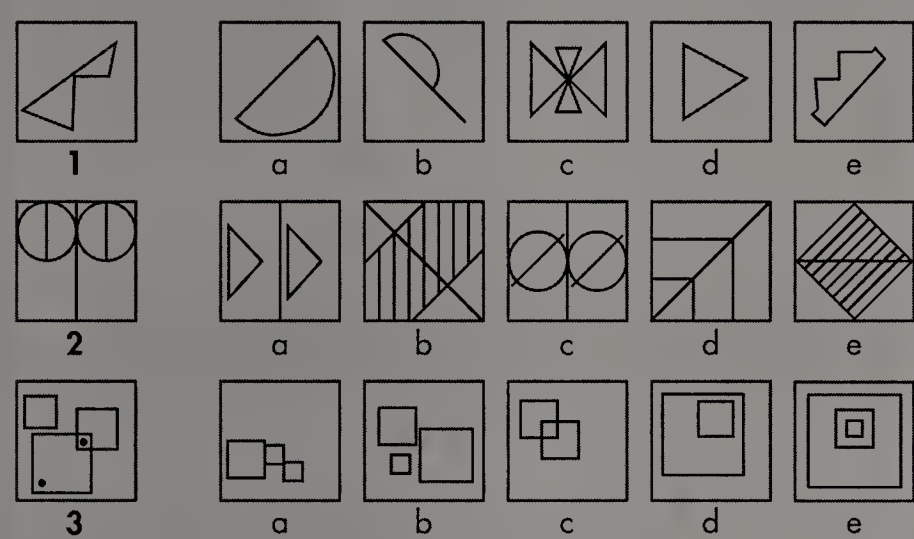

Directions: *Choose which of the five boxes on the right meets the same conditions as the box on the left. Go to* ***www.guardent.com/ciomag*** *for the answer!*

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staking tasks of connecting word processing and publishing tools as incompatible as ATEX and Microsoft Homepage, Logan suggests *Cincinnati Magazine* learn from them. "A lot of people who have already jumped into the game are renting out their systems," he says. "Why not piggyback on their successes?"

LOOK AT ALTERNATIVE REVENUE MODELS

Even though Logan believes that profitability is "a very tricky game for startup Web publishers," he doesn't think it's impossible, provided *Cincinnati Magazine* looks at its content in a new light. "Its events calendar has an obvious tie-in with e-commerce," he says. "It can establish a revenue stream by putting it online, partnering with ticketing agencies and arranging to get part of revenues from sales made through the events calendar."

Logan suggests that Bohmer and Morgan sit down and brainstorm about all possible revenue models. "There are many ways to make money in addition to ads," he says, "like sponsorships, e-commerce revenues and sponsored text, which is a huge moneymaker, though it gets dangerously close to editorial boundaries."

Editor Kitty Morgan thinks a website can attract new print advertisers.

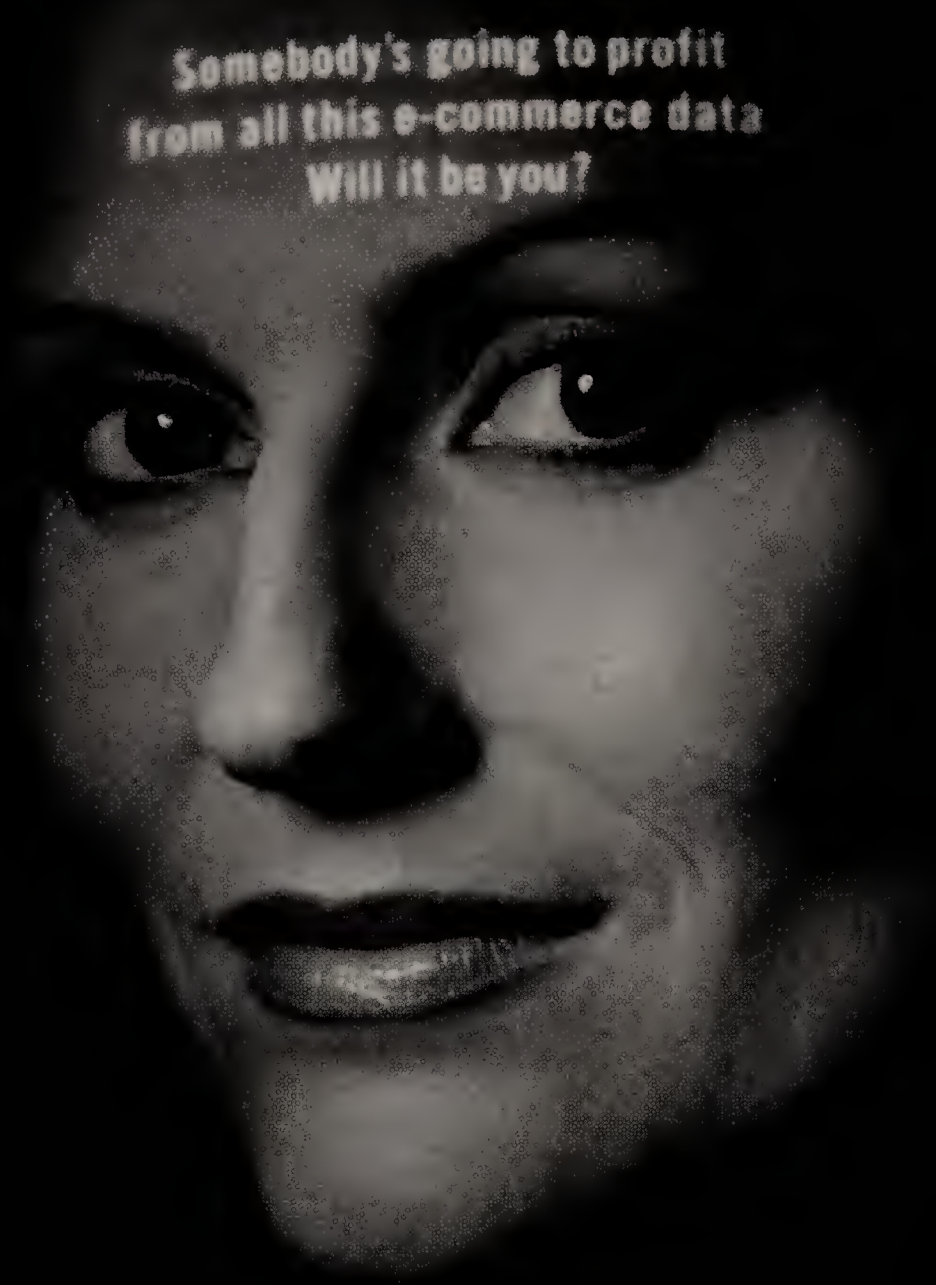
ENTICE ADVERTISERS

Cary Berman, an angel investor based in Chicago, thinks content sites can be lucrative investments. He predicts that content companies like News Corp., Marvel Enterprises and Disney will prevail over portals like Yahoo. But Berman warns that small sites are viable only if they attract niche audiences. "The problem with content is people don't pay for it," he says.

"You can't just put the feature articles online. You have to build a new model around it," says Berman. And a model that would entice Berman to fork over cash would have to attract a strong niche audience or revenue base. "They need to figure out how they can rearrange their assets to meet a need that isn't being met in Cincinnati. Maybe it's artsy listings, maybe it's real-time, up-to-date information. Whatever it is, it has to attract very targeted advertisers."

Attracting advertisers, ultimately, may require crossing the boundary of editorial and advertising that many journalists hesitate to cross. The Vineyard Group's Guterman suggests that doing so would alter the magazine's identity. But if it doesn't go that way it probably won't make money, says Guterman. "Going online merely to be part of the Web is not a sufficient reason to spend a lot of money." CIO

Emelie Rutherford writes about emerging Web business models and markets for CIO.com. E-mail her your online war stories at *erutherford@cio.com*.



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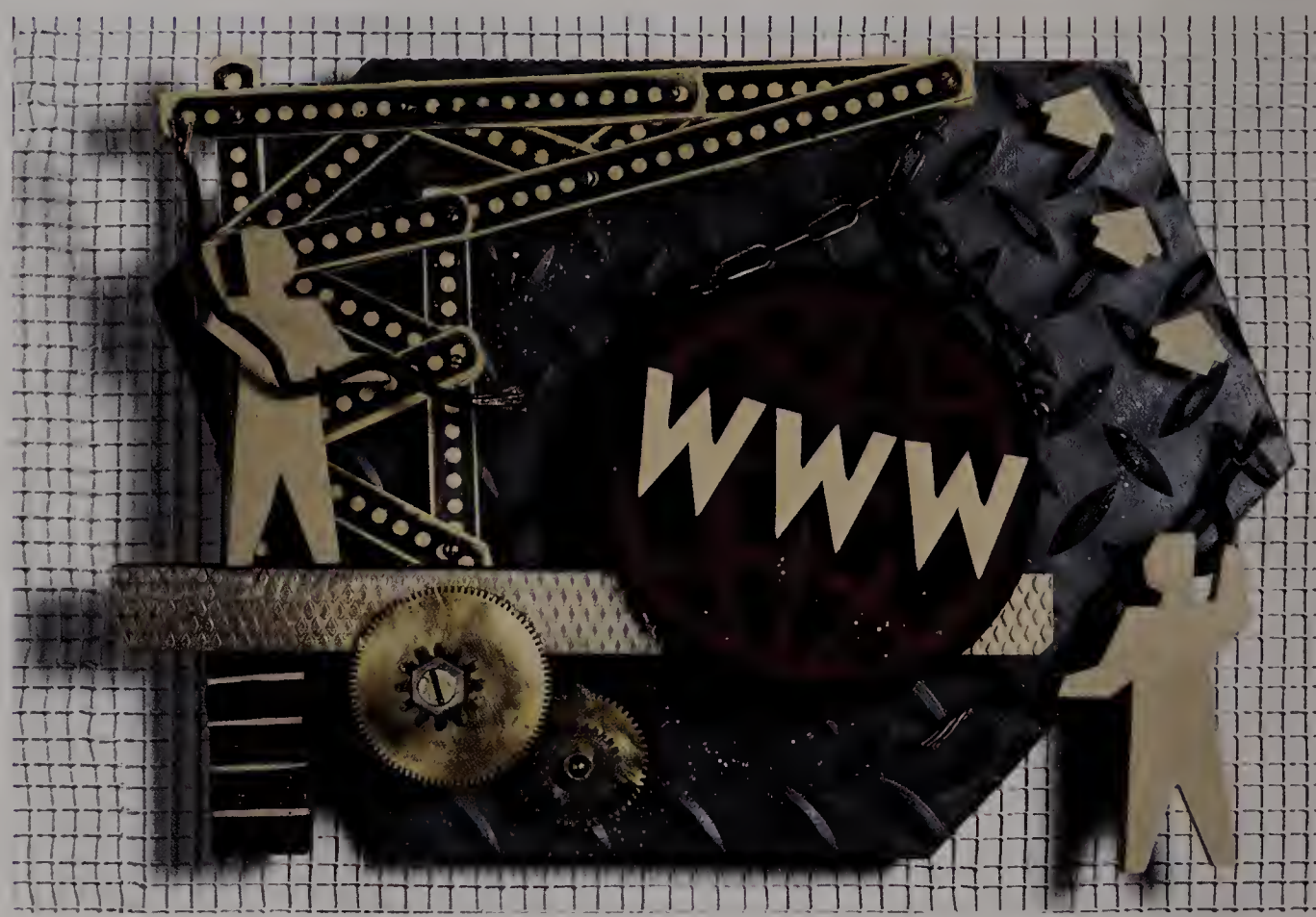

ILLUSTRATION BY MARILYN JANOVITZ

Instant E-Commerce

Take care when choosing off-the-shelf solutions **BY J. BROWN**

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

WHEN KEITH SCHAMIS, general manager of NAPAonline.com in Atlanta, the online division of the National Automotive Parts Association (NAPA), realized that the company needed to launch an e-commerce initiative in order to stay competitive, he was concerned. "We had such a large amount of data—more than 140,000 SKUs—and it wasn't structured to be displayed and handled in this manner," he says. "But we knew we had to get in the e-commerce game."

Schamis was not alone in his dilemma. As

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consumers increasingly accept e-commerce, companies are finding that they have to jump in quickly or risk falling behind. "Regardless of the strategy or purpose, the benefits to having a website continue to demonstrate that the digital age makes businesses stronger," says Chris Anne Wheeler, vice president of information services for ActivMedia Research, a Peterborough, N.H.-based e-commerce and online market research company.

But because most businesses don't have the expertise or personnel necessary to build top-notch e-commerce systems in-house, more and more of them are turning to vendors to handle their e-commerce functions from end-to-end. IT vendors, in response, have launched multiple new e-commerce offerings in hopes of capturing a piece of this potentially huge market.

But end-to-end e-commerce systems—while appealing in theory—can be complicated and difficult to deploy.

In March, Cambridge, Mass.-based Giga Information Group released a report, "Who's Overpromising, Who's Underdelivering in End-to-End Internet E-Commerce Solutions." The report asserts that e-commerce has become so broad and so fundamental to business that claims of complete e-commerce solutions are simply not credible. Andrew Bartels, author of the report and vice president and research leader for e-business applications and strategies at Giga, notes, "When you look closely at vendors who claim to have a broad offering and even have the products that meet each criteria of e-commerce, you find that many of those pieces are second- or third-rate."

But the pressure to deploy e-commerce initiatives continues to increase, and business owners are being forced to make tough decisions. "It often comes down to a choice between a vendor that does a little bit of everything but doesn't have the depth versus a vendor who has depth in one area but is weak in several others," says Gene Alvarez, an analyst with Meta Group based in Stamford, Conn.

Mastering Processes

Though no two company offerings are exactly alike, most include tools for creating a Web presence equipped for secure payment processing, managing the supply chain and handling digital certificates, customer relationships, shipping, security and support. To further obscure the process, electronic storefronts must integrate with a company's existing back-end and legacy systems as well as corporate data. The systems often require staff training and off-site hosting as well.

But this winding road hasn't deterred many vendors from trying. The end-to-end e-commerce field is crowded with competitors, including some of the most well-known names—Hewlett-Packard, IBM, Microsoft, Netscape, Oracle and SAP—as well as newcomers, such as 360Commerce, Ariba, Breakaway Solutions, BroadVision, Commerce One, Net Sales, Open Market and Vista.com.

Because vendors have respective strengths and weaknesses, some companies are electing to work with more than one in hopes of getting the best overall solution. Office-supply giant Staples, for example, combined products from Ariba, Commerce One, IBM, Metiom and Oracle. And, Bartels notes, "using more than one provider may mean you get more services that allow you to differentiate yourself and more options that might be relevant for you."

But the majority of companies go with a single vendor for one very important reason. "Using one vendor gives you the satisfaction of knowing who you can hold accountable when something doesn't work the way it's planned," says Bartels. "The problem with patching together multiple solutions from multiple vendors is there's a certain amount of buck passing that occurs. Given that these applications are hard to implement and that things do go

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Nose for Security

It's one thing to say that your systems are secure, but it's another to know it for sure. To that end, **Cyrano** has released **e-secure 2.1**, a suite of security testing tools intended to identify potential weak points inside e-commerce systems as well as corporate networks. The software consists of a console that controls the testing procedures and a number of modules—such as firewall, database and network—that let administrators search for vulnerabilities. Each module includes test cases that simulate attacks by various types of intruders. The product then reports the results of these simulations so that administrators can make appropriate changes. The product costs $10,000. For more information, visit *e-secure.cyrano.com*.

PDF Powerhouse

With readers for nearly every platform and support for highly detailed documents, Adobe's PDF file format can act as the foundation for many types of file transfers. To aid in the task, **ActivePDF** has unveiled version 3.5 of its suite of PDF tools. The suite centers on **ActivePDF Server**, a Windows NT service that can take output from nearly any Windows application and convert it to PDF format. The server is available in both standard and Professional versions (Professional supports

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wrong, having one person to yell at definitely has value."

And there are other advantages, beyond simply having one company to hold accountable. Speed is one of the biggest. "When time to market is the single most important criteria, having a single vendor provide all the key elements of your solution—even if some of them are subpar—is the best route," says Bartels. "You can always go back later and refit or replace the parts that aren't as strong."

Matchmaking

Before you can implement, however, you need to decide on a technology direction and a vendor (or vendors). And choosing a solution provider can be difficult. But there are some basic rules to follow.

Kneko Burney, director of e-business infrastructure and services for Scottsdale, Ariz.-based Cahners In-Stat Group, recommends a company start by evaluating what it wants from its system. "Do you want to communicate better with customers, lower the cost of sales or both? Figuring out exactly what you want makes it easier to find the provider that can best meet that objective."

It's also critical to decide early on whether or not you want to outsource hosting services. The cost of the IT infrastructure required to host a system in-house can be very high. For companies not well versed in technology, leaving the technical worries to someone else can be extremely valuable.

However, most companies won't want to outsource forever, since that means depending on and paying someone else. "Starting with a hosted solution allows a business to figure out what kind of interest there is for its website," says Alvarez. "I usually recommend outsourcing for no more then 12 months before evaluating whether or not to bring services in-house or scale up the hosting agreement."

Once a company evaluates what type of services it wants, it should carefully evaluate which vendor is best suited to its needs.

"A good match between the product offerings of the vendor and the needs of the customers is critical," says Alvarez. "Also important is vendor viability. If you have an application that you expect to be using for multiple years, it's critical to know that that vendor is still going to be around."

Since many companies don't know exactly what they are getting into when they launch an e-commerce initiative, support may be the most important factor of all.

The experience a vendor has understanding other businesses and building successful Web architectures for them is also important. Don't be afraid to ask for customer references. "There are vendors that have definite industry and size focuses," says Bartels. "If you don't fit that focus, odds are you're not going to get the kind of product and the kind of support that you need."

In fact, since many companies don't know exactly what they are getting into when they launch an e-commerce initiative, support may be the most important factor of all. "Even though we're moving more and more to packaged applications, they still require installation, customization and integration," says Bartels.

new products

PDF encryption and decryption). Other suite tools include DocConverter (converts more than 280 document types to PDF), WebGrabber (converts HTML to PDF), Spooler (prints PDF files from the server) and more. You can buy components individually or purchase the entire suite starting at $1,299. For more information, visit *www.activepdf.com*.

Sign in Please

Managing website security can be a headache, but **Oblix** hopes that **NetPoint 4.0** can ease some of the pain. NetPoint integrates security policy enforcement and identity management into one product. Using NetPoint allows website visitors access to multiple secure servers through a single sign-on while letting administrators easily modify security policies and audit usage. The tool is designed to be simple enough that even nontechnical users can be assigned specific administration tasks such as adding new users and password management. NetPoint 4.0 costs $50 per seat. For more information, visit *www.oblix.com* or call 408 861-6800.

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"Having a vendor that has the resources to help you with implementation and support is critical."

Then there's always the old standby—custom programming. While the proliferation of companies offering all-in-one solutions has overshadowed companies that offer custom e-commerce programming, it remains an option. "If you already have a website or back-end infrastructure in place, you may be better off just using custom programming to integrate those things," says Burney.

Concentrate on the Core

Providing a vendor can truly deliver what it promises, all-in-one e-commerce solutions can get companies into the e-commerce game quickly and easily while allowing them to continue to concentrate on their critical business practices.

"E-commerce was an area where we didn't have a lot of competency," says Mike Prince, CIO of Burlington, N.J.-based Burlington Coat Factory, who used a solution from 360Commerce. "Outsourcing an entire solution meant we didn't have to divert resources from other projects to build this at a time when there were a lot of other initiatives going on."

As for Schamis at NAPAonline.com, going with an all-in-one solution from IBM eventually helped ease his anxieties about e-commerce. NAPAonline.com's website went live in approximately eight months. Since that time, Schamis says, the company has expanded its market share overall, extended the NAPA brand online and currently dominates the online market in this industry.

"By outsourcing our e-commerce functions we've been able to focus more on our core business and the thing that is most important—taking care of our customers," he says. ■

J. Brown, a California-based freelance writer and editor, has been writing about technology and business issues for the past eight years. You can e-mail her at *justinebrown@quiknet.com*.

REVISIT
e-mail

E-Mail Explosion

Few expected electronic messaging's meteoric rise

BY FRED HAPGOOD

ANYONE WHO has spent time on the technology watch knows how often "paradigm shifts" and "new industrial revolutions" are announced—and how seldom they actually come to pass.

In August 1992, *CIO* ran a story describing a change in the architectures that supported and defined e-mail. The article pointed out that as a result, opportunities might arise "to enhance a variety of business activities." This mild forecast turned out to be true in the same sense that Noah's meteorologist could claim points for predicting scattered showers.

Up through the '80s, e-mail was not a central concern of CIOs. For all but the largest or most technical companies, e-mail was outsourced to dialup message switching services such as CompuServe or MCI-Mail. E-mail services were expensive (often 20 cents or more a message), dial-up connections measured out their bandwidth in teaspoons, and the software was primitive and inconvenient. Sending mail between messaging services was especially burdensome, often requiring the faultless entry of huge address strings. There was an alternative called the Internet, but it was of interest mostly to Unix junkies.

The point of the article was that all these walls were coming down at once. Enterprises were installing local-area networks, which meant they could take their internal e-mail traffic in-house and deliver it for free over their own (relatively) high-bandwidth Ethernet networks. New standards such as Microsoft's object linking and embedding (OLE) made it possible to attach various types of files and multimedia to messages. Companies were building gateways that handled the job of routing calls among messaging services and even over the Internet without demanding the sender have a degree in computer science.

ILLUSTRATION BY STEVE DININNO

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Taken together, these developments "promise to bring electronic mail to its full potential as a strategic information-handling resource," we concluded soberly.

As it turned out, e-mail emerged like one of those volcanoes that pop up in the fields and surprise Mexican farmers: One day there's steam curling up out of the corn patch, and a year later a lava-drooling mountain is raining fire on the countryside. That's e-mail. According to Framingham, Mass-based IDC, a sister company to *CIO*'s publisher, CXO Media, about 2 billion business-related e-mails were sent daily in 1999, which is approximately 10 times the number sent in 1995.

This explosive growth has tended to reshape enterprise information architecture around e-mail. According to Palo Alto, Calif.-based e-business consultancy Creative Networks, more than a third of the data references made by employees during a typical workday are to stored e-mails. "Increasingly, the corporate memory is e-mail," says Chris Gray, director of product management of OTG Software, a company in Bethesda, Md., that makes industrial-strength e-mail management tools. The medium is also shaping up into a core tool in marketing, customer service and technical support. Sometimes it seems unclear whether e-mail is an application of networking or whether networks are just an implementation of e-mail. "I suspect e-mail has driven LAN sales almost as often as the other way around," observes Ron Haradian, e-mail guru and director of technical marketing for Newark, Calif.-based ClickServices.com, a wireless communications company.

As a result, e-mail management has moved from a marginal activity for CIOs to one that is nearly the entire job. CIOs today have to think about e-mail viruses, spam, privacy, security, retention and retrieval policies, device compatibility, unified messaging and capacity management. None of these are simple problems. Spammers prove endlessly ingenious, lawyers can always figure out a new complaint, and even the best capacity-management plan will fail on that bright day when employees decide to e-mail 100MB movie trailers back and forth.

Perhaps paradoxically, as the cost and complexity of dealing with e-mail keeps rising, many companies are returning to the outsourcing model—but for a very different set of reasons. Where once e-mail was outsourced because it was too peripheral to worry about, today the application is so complex and critical that many companies find it hard to attract and develop the requisite expertise. They are turning instead to a new sector in the information industry—e-mail service providers such as New York City's Mail.com.

As it turned out, e-mail emerged like one of those volcanoes that pop up in the fields and surprise Mexican farmers.

You might think that once everyone on the globe starts spending several hours a day sending e-mail that we would approach a natural limit, but computers are getting steadily better at writing messages themselves, both to humans and each other, and that population is truly boundless. Real-time messaging—text chat, Internet telephony, videoconferencing and collaborative editing—is giving the medium some competition, but store-and-forward is too useful to give up much ground. The hard truth is that there is no relief anywhere in sight, short of a popular insurrection. ■

Add to the e-mail overload: Send us your war stories at *et@cio.com*.

new products

Spice Up Your Site

Saffron Technology has launched **SaffronOne**, its Java-based personalization and knowledge-management tool. Offered for customizing Web content for site visitors and as a tool for internal decision-making applications, SaffronOne combines both associative memory (tracking data across many users) and individualized techniques to help ensure that users receive the information that is most relevant to their needs. Unlike some other tools, SaffronOne does not require that a company develop rules or decision trees before implementation. It can also take advantage of current customer information. A development license costs $95,000. Production licenses begin at an additional $255,000. For more information, visit *www.saffrontech.com* or call 919 468-8201.

Security Update

In the interest of electronic safety, **Equifax Secure** has released an entire suite of **eBusinessID Digital Certificates** designed to help ensure private communications. The suite includes TradeSecure (for communicating with trading partners), EmployeeSecure (for validating clients and e-mail messages from employees), ConsumerSecure (for business-to-consumer interactions) and

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PREDICTIONS
networking

Going Gigabit

GIGABIT ETHERNET IS GROWING FAST, and 10Gb Ethernet will soon follow, according to a recent report by Scottsdale, Ariz.-based Cahners In-Stat. According to the report, "Gigabit Ethernet and the Power of Ten," gigabit Ethernet sales should expand from just under $2 billion in 1999 to more than $20 billion in 2004, with 10Gb Ethernet growing from $11 million in 1999 to more than $4 billion in 2004. "If you don't have some gigabit Ethernet somewhere, there's something wrong with that," says report author and Senior Analyst Lauri Vickers.

The report states that a number of factors will drive companies to implement gigabit and faster network technologies, including the bandwidth requirements of customer relationship management tools, voice and video over the LAN, and expanded Internet use. Corporate use of storage area networks and metropolitan area networks (MAN) will also demand the ever-faster speeds that 1Gb and 10Gb Ethernet can provide.

In the near term, the bulk of that speed will come from 1Gb Ethernet across copper, which allows companies to continue using their existing Category 5 wiring and is backward compatible with existing standards. The 10Gb Ethernet market will also grow, but more slowly. The 10Gb Ethernet will require fiber connections, meaning new infrastructure. As a result, the report indicates that 10Gb Ethernet will first make headway (outside of specialized LAN applications such as storage networks) in MANs and eventually migrate to wide area networks as companies decide to link existing metropolitan locations.

–Christopher Lindquist

new products

ServerSecure (to guarantee that visitors reach a secure Web server). Certificate licenses cost $55-$125 for TradeSecure, $4-$25 for EmployeeSecure, $6-$21 for ConsumerSecure and $79 for Server Secure. For more information, visit *www.equifaxsecure.com* or call 877 857-7640.

Watch Your Web

Quicksand Development has added several new enhancements to its **@Watch** website monitoring service. The @Watch Webshepherd engine simulates a browser visit to your site and checks performance, content, site down time, links and hacker activity. The service now also supports sites that use cookies, Macromedia Flash or Shockwave content and password protected pages. Pricing depends on how often @Watch checks a site as well as the various features tested. Basic @Watch Enterprise monthly service costs a $49.95 setup fee plus $186.95 a month for hourly testing. For more information, visit *www.atwatch.com* or call 513 455-5763.

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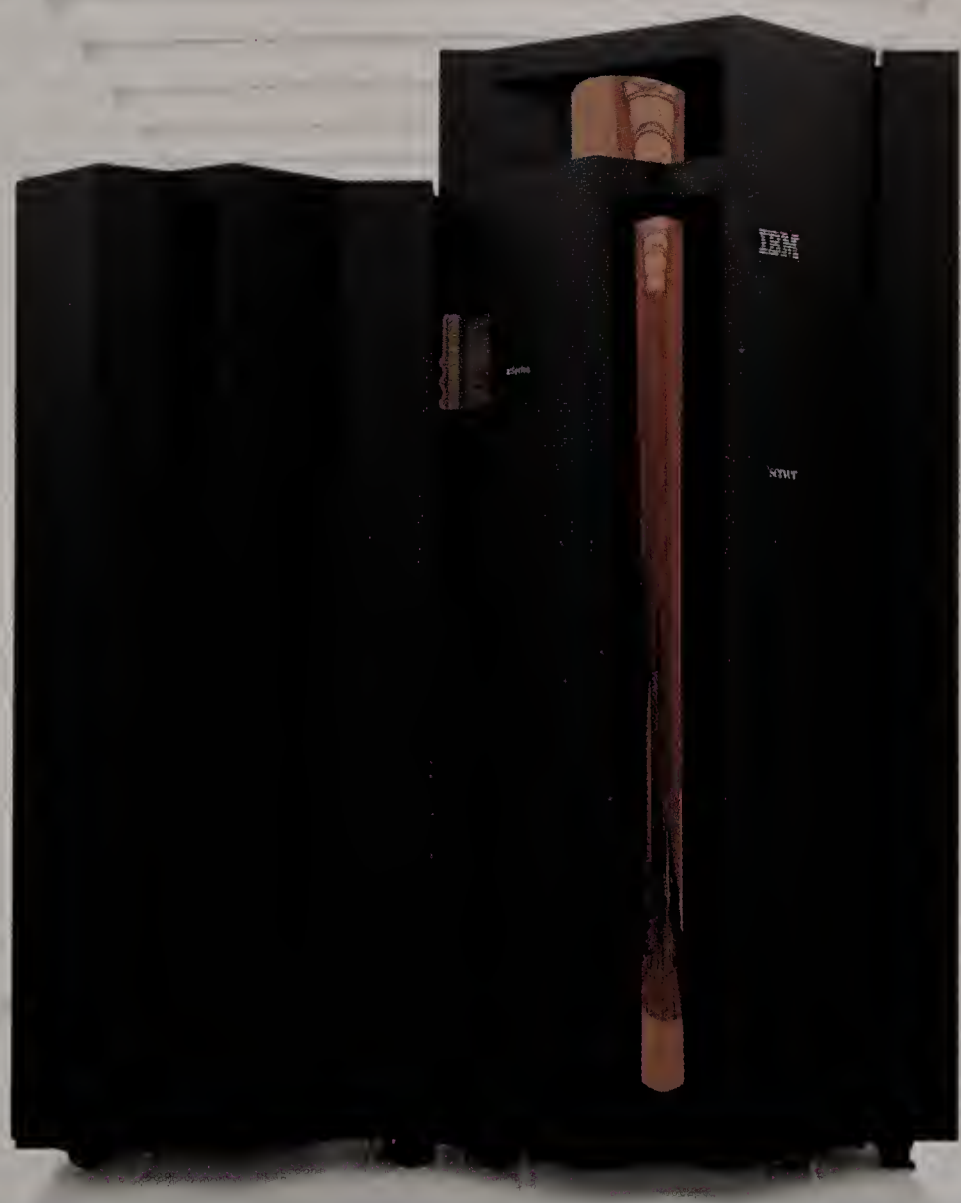

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UNDER DEVELOPMENT
molecular motors

Micro-Factories Built on a DNA Foundation

WHAT WOULD YOU do with a pair of motorized tweezers that are 1,000 times smaller than the head of a pin? Pluck a flea's eyebrows, perhaps?

Actually, there aren't any practical applications for motorized tweezers that are so small they can't even be observed with a microscope, but that doesn't mean the invention is useless. "The tweezers were developed to prove a point," says Bernard Yurke, a research physicist at Lucent Technologies' Bell Labs in Murray Hill, N.J.

The point Yurke wanted to make is that molecular-size motors could assemble complex structures, such as electronic circuits, by manipulating individual molecules in an orderly fashion. Such technology may someday help the semiconductor industry—and computer users—by allowing the fabrication of chips with billions, rather than millions, of transistors. A new generation of molecularly assembled chips would enable the development of computers that are much faster and smaller than today's systems.

Yurke was inspired to create a DNA motor when he considered how natural protein motors in living organisms cause muscle contractions. "It then dawned on me that DNA could be a good material to use to make a molecular motor," he says. Working with several other scientists at Bell Labs and Oxford University, Yurke took a double helix DNA structure, which usually floats with its arms open, and began playing with it. He soon discovered that he could make the arms open and close by adding or subtracting another DNA strand, forming a tiny set of tweezers. Since the DNA structure was too small to inspect visually, the researchers attached a pair of dye molecules to the ends of the strand and used fluorescent light to view their motion.

Andrew Turberfield, a reader in physics at Oxford University and one of the project's researchers, says the tweezers themselves aren't all that important. "What's significant is the idea that we can induce motion on a nanometer scale and create, in effect, a molecular assembly line," he says. He also notes that researchers are already building on the tweezer discovery by attaching DNA motors to electronically conducting molecules that can assemble simple molecular-scale circuits.

How long will it be before molecular motors can be put to work building ultradense computer chips? Yurke isn't sure, but he admits that commercial applications aren't exactly around the corner. "Perhaps in 10 years. We'll have to see how the work advances. But the good news is that we've taken the first, important step," he says. *–John Edwards*

Yurke was inspired to create a DNA motor when he considered how natural protein motors in living organisms cause muscle contractions.

ILLUSTRATION BY CHARLENE POTTS

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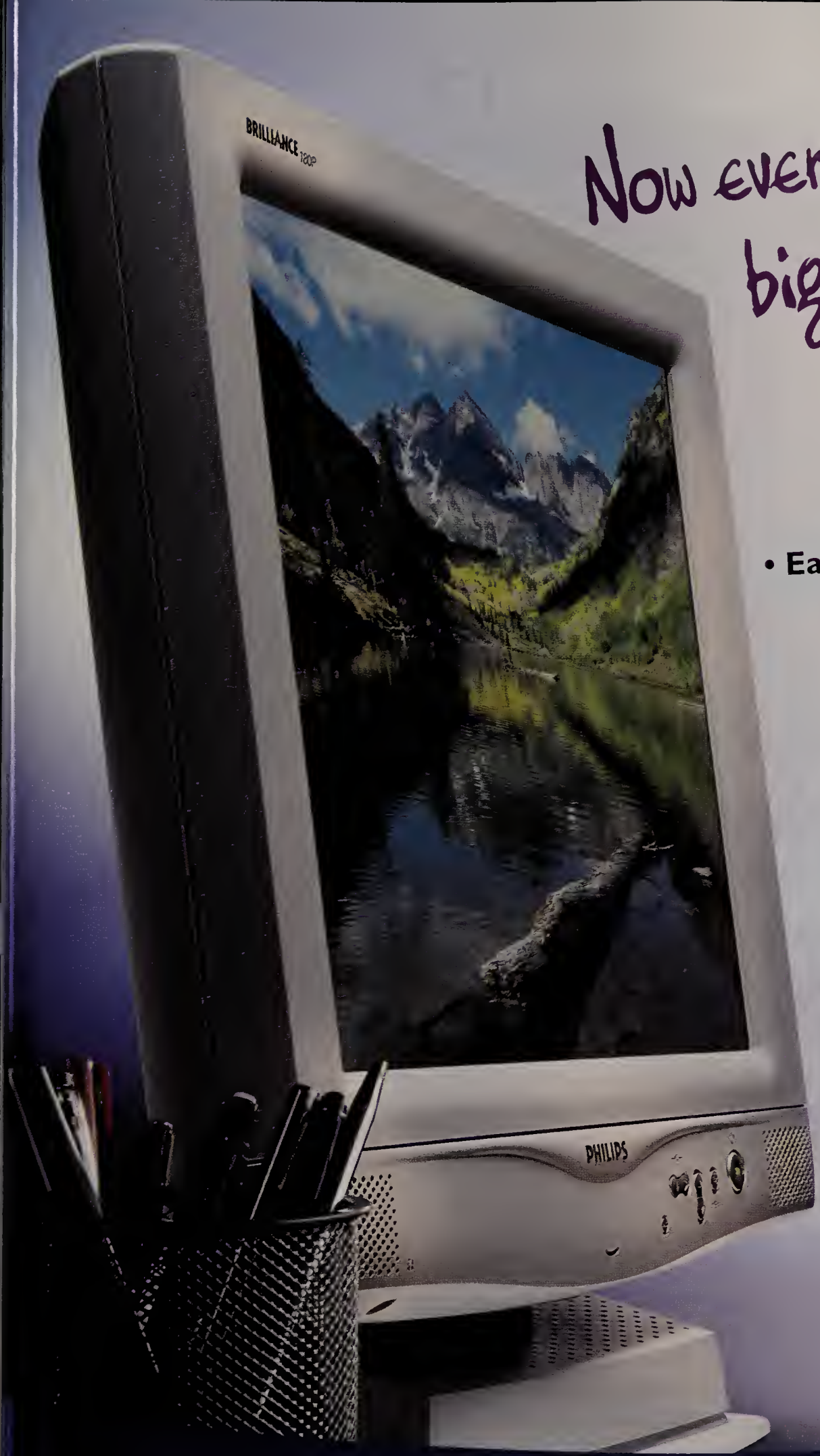

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PUNDITS
Eric Knorr

Content Management Crossfire

Proper tools can help keep the peace—if you provide them

KNORR

Deploy a content-management system and stay as far away from the melee as possible.

WEBSITES OFTEN bear an unfortunate resemblance to the Balkans—no one likes how the turf has been divided, and firefights may erupt at any moment. Marketing has one ax to grind, engineering has another, and that self-styled Web expert with a "C" title has yet another.

My advice: Deploy a content management system (CMS) and stay as far away from the melee as possible. As you may know, a CMS stores content in a database separately from the templates that control its appearance, so content can be updated or reused in various contexts without anyone touching the HTML. The practical result? Self-service: HR can post its own job descriptions rather than blame IT when the CFO asks why the controller position isn't on the site. And if product information isn't up to date—hey, it's not IS's fault, talk to marketing.

The range of CMS solutions is boggling. Big sites with thousands of dynamic pages may need an industrial-strength CMS such as Broadvision One-to-One Publishing, Interwoven TeamSite or Vignette V/5, each of which costs a couple hundred thousand dollars and should be deployed only with the help of a system integrator. On the other hand, with modest, brochure-like sites, you (or a contractor) can build a primitive CMS with browser-based forms, one for each template, on top of Microsoft SiteServer or even Allaire's ColdFusion.

Here are a few issues to ponder when selecting a CMS:

Workflow and scheduling. Large organizations need a CMS that sends automatically triggered e-mails to everyone who needs to see a document before it posts. A CMS should also let back-end users choose the posting date and time in advance—or IS staff members will eventually end up posting stuff in the wee hours of the night.

Database compatibility. The whole point of the Web is to leverage your existing data and use it to sell the company along with its products or services. Don't accept any solution that demands you restructure existing databases to make it easier for a CMS to handle the data.

Multilevel security. Generally, one person per department should have the clearance to post content to a staging server. In all cases, the authority to actually post content to the live site should rest with one or two people.

Syndication and personalization. To distribute content around the Web, you'll need a CMS that maps content objects to XML data types. And if your site will deliver custom pages based on user preferences, you'll need a CMS that breaks documents down to a granular level so that only relevant material gets served.

Offline integration. If your company produces lots of print material, you may be a candidate for a system that integrates offline and online publishing. Both Openpages' ContentWare and Worldweb.net's Expressroom I/O hook into QuarkXPress so that master documents can ensure consistent offline and online content.

Remember that no content area of a site is too small for a CMS solution. Reliability, availability and security are your business. The content is all theirs—and they're welcome to it. CIO

Eric Knorr is an independent content consultant who frequently works with TIRtech.com in San Francisco.

PHOTO BY ED CALDWELL

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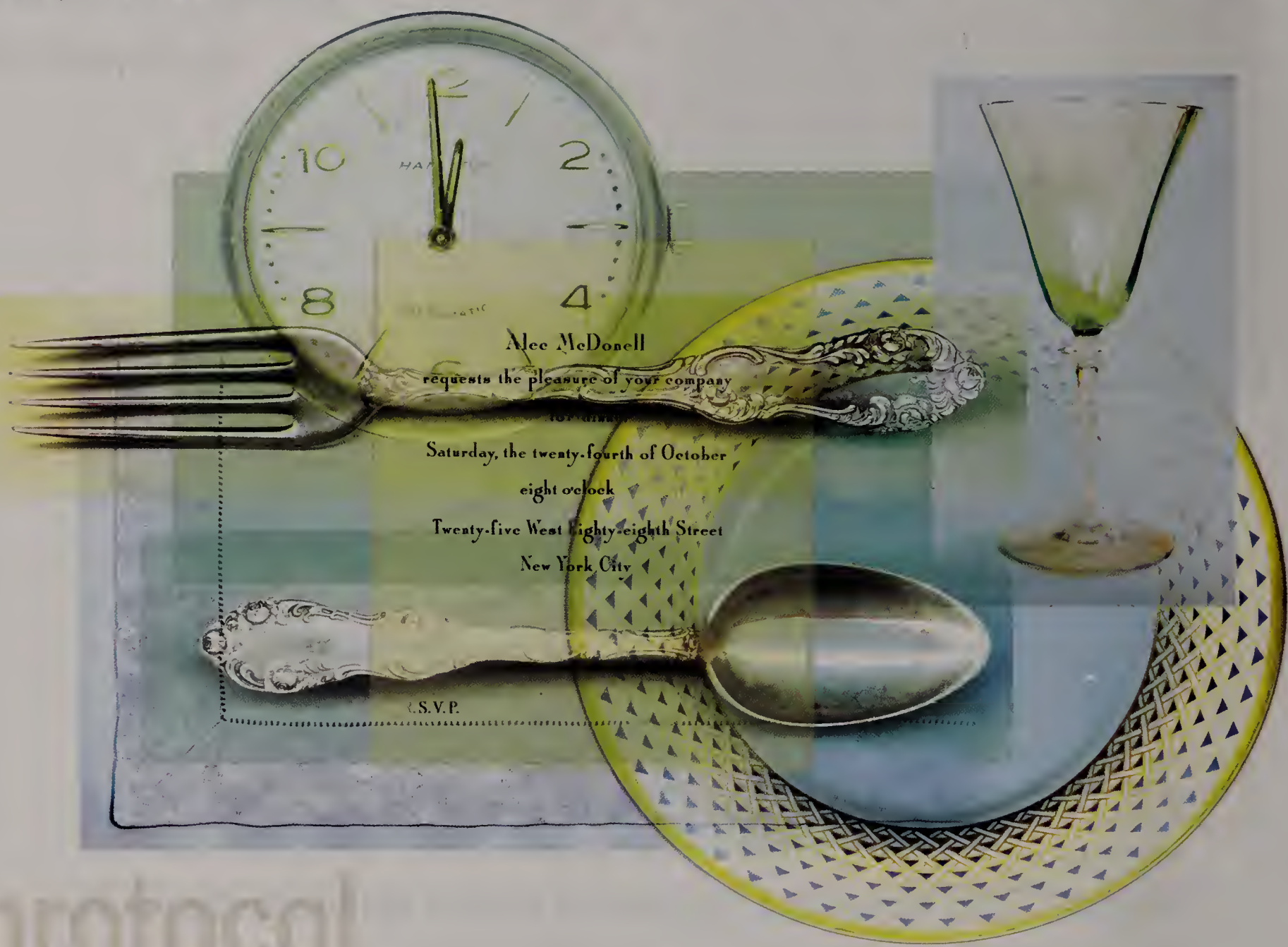
EDITED BY SARA SHAY AND LAFE LOW



protocol

Guess Who's Coming to Dinner?

So you're throwing a business dinner party, but you don't have a clue how to do it. Here are some tips from masters.

BY JEFFREY L. SEGLIN

IF YOU WERE Letitia Baldrige, who was Jacqueline Kennedy's chief of staff in the White House and whose etiquette books have sold more than two million copies, throwing a successful dinner party for your colleagues would be second nature.

But then you're not Letitia Baldrige, are you? Relax. If you're a nervous wreck, says Baldrige, "that immediately transmits itself in waves throughout the room. And everybody is all nervous and upset along with you."

Baldrige's advice for setting a relaxed atmosphere is to be prepared. "If you know that the food you're serving is right, and you keep to the right schedule and don't have everybody drink too long and all be drunk when they go into dinner, then you can be self-confident and sail along," she says.

For smooth sailing, consider the following advice:

1. Have a goal. It may be to welcome a new partner to your business or to celebrate a particular success in the company.

ILLUSTRATION BY MARGARET RIEGEL

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But have one. "Having a goal makes it worth the money and keeps you centered," says Baldrige.

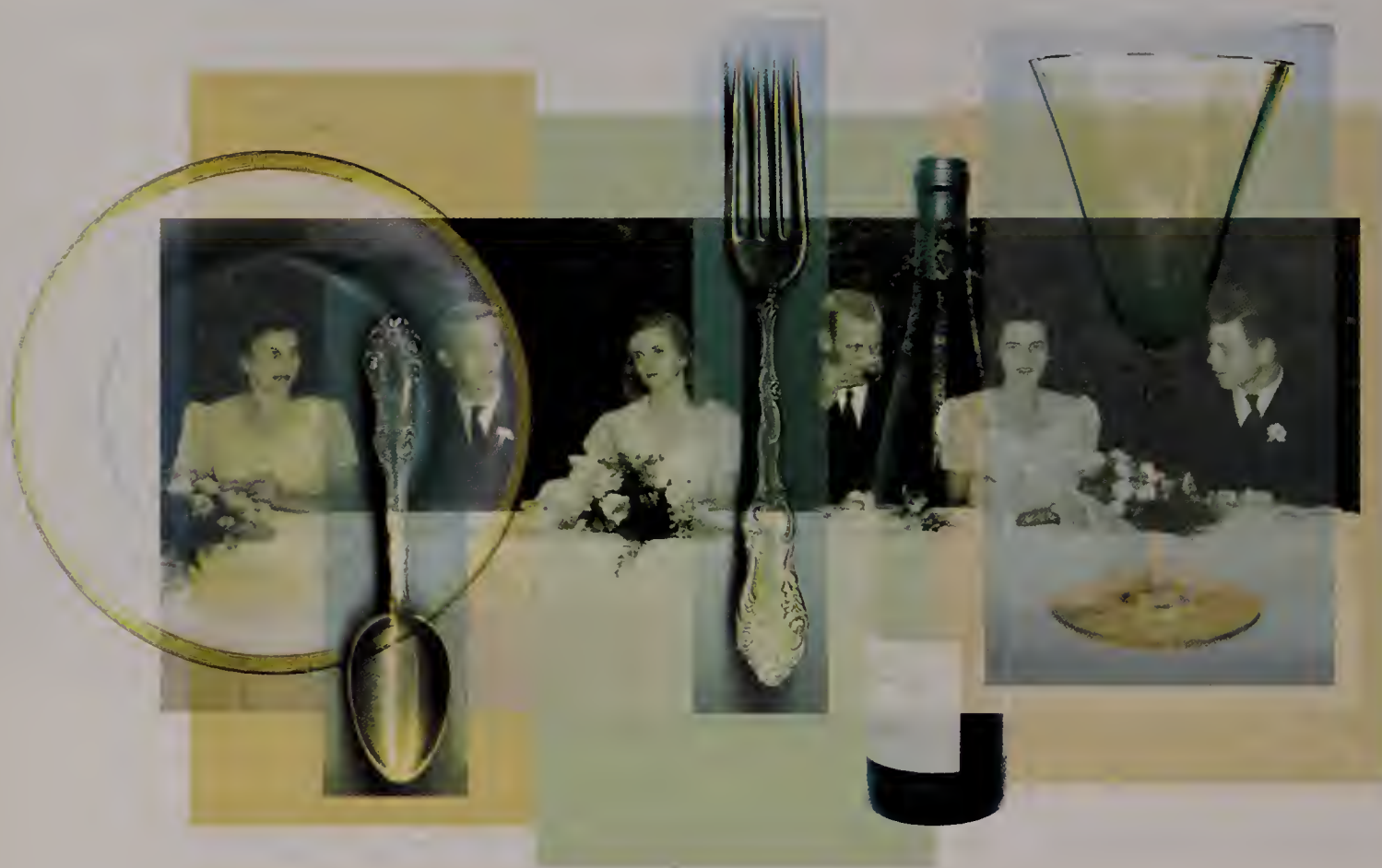
2. Send invitations well in advance. "If you care about who's going to come to your dinner, send invitations out way ahead, like two months," says Baldrige. It's your dinner at your house, so send the invitations to the home addresses of your guests.

3. Hire a caterer. "Do not do this on your own," says Nancy K. Austin, coauthor with Thomas J. Peters of *A Passion for Excellence* (Random House Value Publishing, 1997), the sequel to *In Search of Excellence* (McMillan Library Reference, 1997), and a professional speaker based in Capitola, Calif., who has attended hundreds of business dinners. "It's a business investment and a good one. As host, a catered meal lets you circulate, meet people and put them at ease. You [or your spouse or partner] should never be slaving away in the kitchen."

4. Stack the guest list. Invite people who you know are peppy and funny, and tell them you expect them to keep conversation flowing. "They'll be flattered," says Baldrige. If you plan to host only colleagues from your company, find people who fit the bill from those ranks. But dinners are a wonderful way to get people talking and ideas brewing, so it's never a bad idea to invite charming friends from all quarters.

5. Control the flow of alcohol. Austin recommends limiting the cocktail hour to a half-hour, serving appetizers with the drinks, having one red and one white wine at dinner and skipping the after-dinner drinks.

6. Don't seat couples together. There's established protocol for seating at dinner parties, but the chief advice from the experts is to have the host and hostess sit at opposite ends of the table and then alternate seating men and women around the table, making sure not to seat couples together. "It's absolutely necessary," says Baldrige. "It really shows enormous lack of self-confidence if husbands have to sit next to wives. How boring." If there's a male guest of honor, he should sit to the hostess's right, and his spouse sits to the host's right. In the case of a female guest of honor, the reverse applies. Beyond that, seating is your purview, and shame on any guests who move the place cards, says Baldrige.



7. Be prepared for surprises. The most common surprise, says Austin, is someone who tags along with an invitee or just happens to show up. In cases like these, she says, "you should greet that person as if she's exactly who you've had in mind to make the evening perfect."

8. Don't cry over uninvited guests. You don't need to invite the boss to every business dinner. Clearly, there will be times when it's simply inappropriate unless you're close personal friends. And don't fret if you've forgotten someone you should have invited. "You always will forget someone," says Baldrige. "And you'll feel terrible about it. But you can always pick them up the next time. That will goad you into arranging another dinner."

9. Don't wait for latecomers. It's bad manners to arrive late and throw the whole timing off for a dinner party. "As host you should go ahead with your original timing, and if they're late and have to walk into the dining room when everybody's in the middle of their dinner, so what?" says Baldrige. "They might learn a lesson."

You'll know if your dinner party is going badly, says Baldrige, because you'll be able to feel it. "If it's a drag, there's going to be a tremendous silence in the room," she says. "Everyone is being too polite and too quiet, and then you've got to worry that your party is a real flop."

On the other hand, she says, "when people are talking up, there's a certain excitement to the party. There is a glow to people's eyes. You can just tell that people are having a good time by looking at them and listening to them."

Jeffrey L. Seglin is the author of *The Good, the Bad, and Your Business: Choosing Right When Ethical Dilemmas Pull You Apart* (John Wiley & Sons, 2000). He teaches at Emerson College in Boston and can be reached at *jseglin@post.harvard.edu*.

ILLUSTRATION BY MARGARET RIEGEL

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fashion

Offsite but Not Unseen

It's not the office, but it's not vacation: How to dress for conference casual **BY TINA SUTTON**

Resort-bound women can trade in their heels for festive flats, like these in calf leather from Ann Taylor (above). Men, drop the socks and slide into a cushy driver moc from J.P. Tods.

THE OFFSITE CONFERENCE, often at a resort, is both a perk and an educational tool. It's sort of the business equivalent of Mickey Rooney's old film line, "Hey, kids, let's put on a show!"

In years past, a luxurious casual setting with relaxed dress codes was thought to encourage a freer exchange of ideas by getting employees away from staid, stuffy offices. After all, there's nothing like an early round of golf or a lunch break by the pool to get those creative juices flowing. But now that informal office clothing is the norm, many executives are actually dressing up a bit for get-away get-togethers.

The key words here are "a bit." No one wants to wear a pinstripe suit under the swaying palms, but stylish resort clothing that wouldn't fly at the office can be a nice diversion. And the fashion industry is only too happy to comply, with this year's spring and resort wear right out of *Lifestyles of the Rich and Famous*.

For men the color palette is soft, combining knit tops or shirts in Palm Beach pastels—icy blue, yellow, lavender and pink—with neutral tones in trousers, particularly pale gray as an alternative to khaki. For women, the palette includes pastels, shades of violet, red and blue, and spectator classics of black, navy or brown with white.

Elegant, lightweight fabrics such as linen/silk blends and tropical-weight wools combine comfort and good looks. Because natural fibers breathe, unlined lightweight wools are actually more comfortable in the warm weather than heavier cottons or synthetic microfibers. That's why you'll also see the lightest weight cashmere blended with silk and linen in fine-gauge knit tops for both sexes this spring. Silk is another surprising warm-weather favorite, continuing in boldly printed short-sleeve shirts for men and in solid or patterned blouses for women.

For air-conditioned meeting rooms with temperatures that can rival the Antarctic, men should consider bringing at least one jacket that can also be worn over a matching shirt or polo for an evening cocktail party. Navy blazers in silk or tropical wool are the overwhelming favorite this season, with gold buttons back in a big way. Women also need an extra layer for those sub-zero meeting rooms. Consider a versatile shirt/jacket or feminine cardigan.

When a conference-logo canvas tote simply won't do: Prada's primo "bowling bag."

Men's warm-weather footwear is easy. Leave the socks behind and invest in a driver moc from J.P. Tods or a textured classic boat shoe, with red being the hot color. For women, footwear is a bit more difficult. Today's fashionably sky-high-heeled sandals look a bit incongruous at a business conference, except in the evening. Flat or midheel styles in a trendy color are a better bet.

Women can also take advantage of the chic resort styles that typically look out of place at the office, such as sleeveless short shift dresses, long print silk skirts and short tops with cropped pants or capris. Last, if status accessories are a hobby of yours, the new Prada "bowling bag" travel totes are the hottest sellers for short trips or as a substitute briefcase. While they come in all-over leather or microfibers, the trendsetters' favorite is the classic tan canvas with red pebble leather trim.

Tina Sutton is head of Fashion Services, a Boston-based marketing company specializing in fashion and lifestyle trends. She can be reached at *fashserv@aol.com*.

PHOTOS BY FURNALD/GRAY

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business travel

Desert Chic

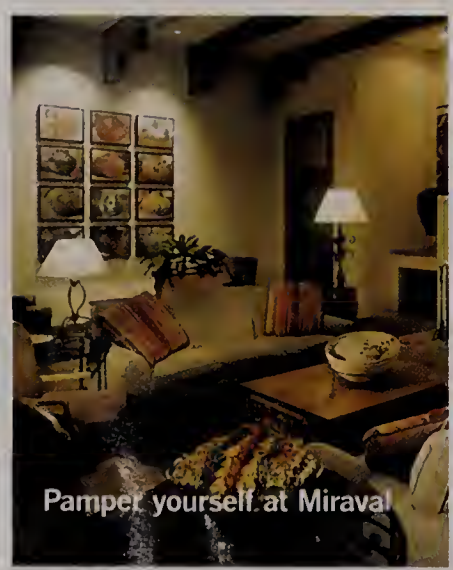
Tucson is an artful blend of old West and new West

BY EDIE JAROLIM

Standing on the outskirts of Tucson, Ariz., you'd almost expect to see Clint Eastwood riding into town. All around you is classic spaghetti western scenery—a high desert valley and mountain ranges punctuated with towering saguaros. Tucson's topography sets the scene for traditional pastimes like horseback riding and trendy pleasures like getting a massage with hot rocks. The city is as laid-back as it is urban chic. (All area codes are 520.)

airport **Tucson International Airport** (573-8000), the only game in town, is small and easily navigable. Unless you intend to hole up in your resort, skip the cabs and shuttles and reserve wheels there. All the major agencies are there, and you'll just be postponing the inevitable if you wait.

hotels The centrally located **Arizona Inn** (325-1541, 800 933-1093; between $130 and $159 per night) blends 1930s charm with contemporary amenities. The all-suites **Windmill Inn** (577-0007, 800 547-4747; $99 per night) is surprisingly reasonable considering its ritzy shopping village location. Among myriad recreational distractions at the **Sheraton El Conquistador Resort** (544-5000, 800 325-7832; between $209 and $299 per night) are 45 holes of golf and 31 tennis courts. Chill out between meetings at **Miraval**, voted the world's top destination spa by *Condé Nast Traveler*'s readers (800 232-3969 or 825-4000; between $395 and $520 per night, per person, double occupancy, including all meals, classes and some spa treatments).


Pamper yourself at Miraval

restaurants Mexico's influence rules the city's cuisine. Janos Wilder, winner of the 2000 James Beard Award for Best Southwest Chef, performs his blue-corn magic at the upscale **Janos** and the more casual **J Bar** next door (615-6100). Colorful, creative **Café Poca Cosa** (622-6400) roams the south-of-the-border culinary map. For authentic local fare, try one of the friendly, low-key joints along South Fourth Avenue between 22nd and 34th streets. **Anthony's in the Catalinas** (299-1771) serves fine continental cuisine and has a stellar wine cellar and fantastic views of the foothills.

cio-friendly bars/clubs Hotel lounges dominate the after-dark scene. Try the retro-chic piano bar at the **Arizona Inn** (325-1541) and **Loews Ventana Canyon Resort's Flying V Bar and Grill** (299-2020), where you can sip a margarita while watching the sun set over the 18th hole. **Cushing Street Bar and Grill** (622-7984), near the Tucson Convention Center, features an ornate 19th century bar. Nearby, the hip **Arizona-deco Barrio** (629-0191) mixes a mean martini. Squeeze into tight jeans for **Maverick King of Clubs** (748-0456), a down-home country-and-western club with live boot scootin' music.

museums Check out the Ansel Adams-conceived **Center for Creative Photography** (621-7968) and the **Flandrau Science Center and Planetarium** (621-4515), which is astro-geek heaven. Both are on the University of Arizona campus. The **Tucson Museum of Art and Historic Block** (624-2333) incorporates parts of the town's original adobe walls. Its elaborate folk art *nacimiento* (nativity scene) is a holiday treat.

Petroglyphs at Saguaro National Park

family fun The **Arizona-Sonora Desert Museum** (883-1380) is an eclectic zoo, with

PHOTOS OF ARIZONA BY TONY STONE; PHOTO LEFT COURTESY OF MIRAVAL

Mission San Xavier del Bac

don't miss

Whether you stay on the east or west side, you'll be near **Saguaro National Park** (Western District 733-5158, Eastern District 733-5153), which sandwiches the city with acres of surreal, multiarmed cacti. The Spanish-Moorish-style **Mission San Xavier del Bac** (294-2624) was dubbed "The Sistine Chapel of the Southwest" by a restorer who worked on the original in Rome. The **Raven Golf Club at Sabino Springs** (749-3636) is a dramatic desert course designed by Robert Trent Jones Jr.

everything from Gila monsters to prairie dogs. Kids love the fake shoot 'em ups at **Old Tucson Studios** (883-0100), once popular as a western film set. Nearly all the large resorts are family friendly, but **Westin La Paloma** (742-6000, 888 625-5144; $229-$319) has an extensive kids program and one of Arizona's best water slides.

insider's guide **Tohono Chul Park** (575-8468) is a serene desert preserve with an art gallery, plant nursery and two great gift shops. The tearoom is a favorite spot for brunch, but arrive before 10 a.m. if you don't want to wait for a table. The **Lost Barrio**, the shopping row on South Park Avenue between 12th and 13th streets, has the best prices on stylish Mexican home decor imports north of Nogales. Off the beaten path in Saguaro National Park West, **Signal Hill** is full of ancient petroglyphs (a.k.a. rock art).

weather *Average daytime temperature:* 64.3 F *Average nighttime temperature:* 39.8 F *Average precipitation:* 1.07 inches

rent or buy? Short a few hundred reports? **Kinko's** (690-9585) has four locations open 24/7. **Sparkle Cleaners** (624-2369) has 14 stores with same-day (except Sunday) service. **Rent-A-Computer** (292-6771 or 888 310-7889) will deliver.

other resources **Tucson Medical Center** (327-5461) and **University Medical Center** (694-0111) are two centrally located hospitals. **Osco** (888 443-5701) and **Walgreens** (800 925-4733) have 24-hour pharmacies. Contact the **Metropolitan Tucson Convention and Visitors Bureau** (624-1817, 800 638-8350 or *www.visittucson.org*).

calendar **CIO's Enterprise Value Retreat 2001** (800 355-0246) is in town from Jan. 28 through Jan. 31. Check *Tucson Weekly* (free on Thursday) and the Friday Caliente section of the *Arizona Daily Star* for other event listings.

Saguaro Cactus at Saguaro National Park

CIO'S CORNER:

"For entertaining, we often go to **McMahon's** [327-7463]," says Wyllstyne Hill, director of information technology at Raytheon Missile Systems, Southern Arizona's largest private employer. "They've got the best prime rib in town, and they're very accommodating about group size, large or small." Her guests also like **El Charro Café** (573-8225) for its "historic downtown building, its excellent Mexican food and its great margaritas." Hill says golfers who come to town are pleased with **Starr Pass** (670-0300, 800 503-2898). "It's not impossible for them to get tee times," she says.

real life

Got Cows?

This rodeo-riding former CIO traded in the suit for a set of chaps and a rope

BY STEWART DECK

Former Mattel CIO John Phippen's idea of fun includes a lot of riding and roping.

WHEN JOHN PHIPPEN talks about the speed and thrill of the rodeo, his voice rises and his words race. "You let the cow escape and when it sees that it has an opening, it bolts, going Mach 10," he says. "Then I take off after it with my horse going at top speed, staying with the cow and keeping it along the fence until I pass the marker. Believe me, I'm really hauling ass."

He pauses for a breath and continues: "Once the horse's head is past the cow, the cow usually stops and goes in the other direction, which is what you want. Sometimes it won't turn back, and you have to turn your horse into the path of the running cow to slow it down and turn it—but sometimes the cow doesn't even stop. I've seen cows run right through a horse, jump over a horse, or jump over a horse and knock the rider out of the saddle. It's dangerous."

After 10 years as El Segundo, Calif.-based Mattel's CIO, Phippen decided early this year to take some time off to "just enjoy things and have some fun." His idea of fun includes a lot of riding and roping.

In the summers when he was a kid, Phippen would go to his aunt's ranch near Spokane, Wash., and do a lot of trail riding. His interest in horses was reawakened about seven years ago when his high-school-aged daughter began to take riding lessons. He started riding again in the hills near his home about 30 miles south of Los Angeles. Although he found it peaceful and relaxing, he had a hankering for a bigger challenge.

A friend encouraged him to try working cattle. This involved maneuvering himself while on horseback to get a cow going in the right direction. "The first time I worked a cow, the horse threw me off," Phippen recalls. "I thought, 'Hey, that was different!' I tried again, was thrown again, and said 'This is harder than I thought—cool!'" After many unscheduled landings, he learned to stay on and has since entered team cow penning and cow roping contests. Roping requires a well-trained horse so Phippen searched carefully before finding an experienced steed, a 16-year-old movie star. Hollywood, Phippen's bay horse, was a training horse for Billy Crystal in *City Slickers* and Paul Hogan in *Crocodile Dundee*.

Phippen and Hollywood have recently been competing in "working cow horse" contests, sponsored by the American Quarter Horse Association (AQHA). These soon-to-be Olympic events pit rider and horse against a cow, a clock and an open arena in a demonstration of equine athleticism and riding skill. The rider must make the horse skid to a stop from a blazing gallop, pivot and spin on its heels. "Then comes the fun part, the cow part," Phippen says. A cow is let loose in the arena, and the rider and horse control the cow by running it in one direction, turning it, running it back and in a tight circle.

"It's challenging and difficult because the horse knows what to do, and my job is to give it the right cues and then let him work," Phippen says. "He's doing these maneuvers at top speed and it's difficult to sit nice and still in the saddle while it's all happening."

Phippen says he isn't sure when he might return to the corporate arena, but it probably won't be soon. "Right now, I'm enjoying riding and trying to earn enough [competition] points to attend the [AQHA] championships next November in Oklahoma City," he says. Until then, he'll keep riding hard, riding fast, hanging on and having fun. CIO

Stewart Deck has a hard enough time staying astride his swiveling office chair. Tell him your stories, rodeo or otherwise, at *sdeck@cio.com*.

PHOTOS BY MARK ROBERT HALPER

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Difference Engine

The Social Impact of Technology

The Evils of E-Mail

Just because the medium itself breeds brashness doesn't mean we can't civilize it

BY ALEC APPELBAUM

E-MAIL HAS BECOME many people's default form of contact, and why not? It's fast, simple, cheap and independent of time zones and geography. E-mail also makes communication purely democratic; its impersonal white screen and black letters often strip a person's status from her words. As the cartoon caption goes, "On the Internet, no one knows you're a dog." But this freedom often makes it hard to communicate usefully. People can usually figure out what you do from your e-mail, but they can't always determine what kind of person you are. If you will forgive another dog analogy, nobody knows whether you're a poodle who's just been fed or a Doberman with an empty dinner dish. And that makes e-mail a dangerously blind medium. My e-mail inbox at SmartMoney.com, where until recently I reported on tech stocks, received more unenlightening noise than I've heard on the streets of Manhattan. And I don't mean spam: I mean bile.

Many of my most outspoken readers traded stocks online, making consequential decisions without any human contact. Good thing, because their good manners disappeared when they communicated in virtual form. "Grow up and stop preaching

ILLUSTRATION BY RUSS WILLMS

Today I —

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your ethos of oppression," snarled one reader after a story on possible interest rate hikes. Another excoriated my editor for praising a buyout deal. The arrangement, he protested, "left the poor shareholders like me crying for KY jelly." Ahem. How does a writer respond to that? Of course, that's just it. The sender usually assumes you won't respond to e-mail. There's no voice on the other end, no threat of personal confrontation. When you use e-mail, you are truly venting into the ether. The effect fails when the ether responds. A writer who first addressed me as "silly Alec" when responding to a story I wrote suddenly backed down when I wrote back advising him to read the article more closely. And I'll always remember Jacki. One Tuesday, from behind an AOL address, she accused me of trying to scare her with "a trashy piece of scribbling" about yield curves. That Thursday, after I replied with a personal note defending my logic, this stranger changed her tune: "The first part of your article would have been frightening to someone who didn't know better (or didn't read the entire article, for example, my brother-in-law). And you certainly didn't need to reply, that was very courteous. Sorry, Jacki." Forced into dialogue, my e-pal grew a name and a brother-in-law. And I gained qualities beyond my name and mail address. The result: Jacki and I achieved peace. But such peace is elusive.

When you use e-mail, you are truly venting into the ether.

Usually, writing e-mail is a form of mental effluvia. Nobody will interrupt you or cut you off. It's a rush, which helps explain why it has outstripped visually richer media such as videoconferencing. Indeed, most folks feel insecure about their looks and would rather not communicate that way, notes consultant George Simons, who helps companies create virtual teams. E-mail, on the other hand, becomes addictive because it leaves so much unsaid. It never fully answers the recipient's questions, leaving him with a craving for more. It is up to the recipient, says psychiatrist John Suler of Rider University, to infer the sender's purpose and mood. And that can crimp discussion, with noxious results. Arguing online with a friend about hunger relief, I once typed a quick aside, "You see, it's more complicated than that," which my friend found as pompous. Some long, backpedaling e-mails followed. And in business, e-mail miscues can cost money and goodwill. For example, cross-cultural work teams can fizzle if American members, accustomed to rapid-fire exchanges, neglect to flag their missives as requests when e-mailing Europeans and professionals from the Middle East, Simons says. And every time e-mail fails to bridge two worlds, a user may trust it less for serious tasks. That may explain why so many people use e-mail to pass along silly jokes. A rash medium breeds rash matter. As a result, our inboxes grow cluttered, less open to edifying discussion.

Etiquette Lessons

It needn't be this way. Internet pioneer and consultant Howard Rheingold recently reminded me that explicit decorum supported the earliest online discussions, on pre-Web networks like Usenet. Those rules about flaming, self-identification and other matters of courtesy guided a diverse cohort of users. Yet few organizations enforce decorum when they adopt e-mail or instant messaging or intranets. Perhaps rightly so, it may be intrusive or doltish to publish codes of what an employee can or cannot say at work. That's where CIOs can help.

The cues we currently use don't carry much weight. A smiley (formed by a colon, dash and closing parenthesis) from a stranger in my business, usually a publicist, feels about as warm as a recorded assurance that my call is important. On the other hand, a visual set of cues or constraints that make me parse what I've written would make a deeper impression. We could implement cosmetic touches, for instance, like changing the color of an international address to remind impatient Americans to type "request" in the header. Or automatic spellcheckers that force a user to read through a message before she sends it. The e-mail system at my new job makes me find a recipient's address from a list of real names every time I want to send a message. And I write more scrupulously after the recipient's name is burned into my brain. Once I am reminded who my correspondent is, I have a clearer sense of how I should speak to her. To be sure, such precautions only lower the probability of accidents. But the more deliberately people view e-mail, the more prudently we'll write it.

As information architects, CIOs can protect users against disasters resulting from rushed e-mail messages. But ultimately, users must agree on digital grammar that achieves the same pauses, allowances and acknowledgements we've built into other forms of speech. We will learn this grammar the way we learned pencil-on-paper grammar in school: by laboriously pruning our words. We can train ourselves to read e-mails aloud before we send them or set maximum lengths for our messages. CIOs can build the classroom, designing more restricted message windows and interface reminders to slow down e-mail production. But if we as the users don't edit ourselves, our billions of e-mails will transcribe a muddier and meaner society.

And we won't all be able to blame our brothers-in-law. CIO

Have you been victimized by e-mail? Let us know at *difference@cio.com*. Alec Appelbaum writes about culture, business, politics and technology in New York City.

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In the Beginning

BY SRIVATSA KRISHNA

WHEN INDIA WAS WAGING the world's best-known peaceful struggle for political independence, the slogan that gained currency was that good governance cannot be a substitute for self-governance. Today, five decades later, after having missed both the industrial and services revolutions, India needs to learn a new lesson: Self-governance cannot be a substitute for good governance.

Having recognized the need to learn this lesson through several painful experiences, India has embarked on a war for economic freedom and prosperity powered by IT. It is almost as if India is waging a second war for independence—albeit this time for economic, rather than political, goals.

IT is happening everywhere in India—in boardrooms, in schools and colleges, in roadside telephone booths and even in government. In fact, IT is rapidly becoming the only thing to cheer about in contemporary India. It's also the only sector of the economy that's recording blistering growth rates. Let's look at some predictions:

New York City-based consultancy McKinsey & Co. pegs e-business in India at $1.5 billion by 2004 and around $10 billion by 2020, which will represent approximately 1 percent of the world's e-commerce business. McKinsey also estimates that Internet advertising revenues are likely to reach $220 million to $600 million by 2010.

In addition, India is likely to have around 3 million households connected to the Internet by 2004, according to conservative estimates. If one adds Internet penetration through cable and Web phones, that number will be significantly higher. Furthermore, each Internet connection in India is used by four to six people, so the total number of people online will be much higher than that indicated by the number of Internet connections.

To fulfill the projections above, India needs to immediately address several key areas and concerns.

First, India needs to create a world-class telecommunications infrastructure in order to improve call completion rates and dras-

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tically reduce tariffs, which currently are among the highest in the world. Several major call center operations that are keen to relocate to India from the United States and Ireland are staying away because India is unable to provide quality bandwidth with attendant service standards at international prices.

India has two powerful incentives to improve conditions for the call center industry. One, the industry can tap India's low-wage manpower and create several thousand jobs in areas such as medical and legal transcription and data entry among society's lower-middle class where they are needed most. Two, the industry can push jobs and growth away from the major city centers to smaller towns, thereby helping to reduce several urban problems—chief among them being overcrowding, environmental pollution and overloaded infrastructures.

Today, the migration up the value chain has barely begun for various IT companies in India.

Second, India needs to create an enduring supply of knowledge workers and IT professionals who can feed the insatiable demand worldwide for such a workforce. In a report commissioned by the National Association of Software and Service Companies (Nasscom), McKinsey concluded that India's IT sector has the potential to reach $87 billion by 2008; more than half of that total will be export revenues and will contribute over 7.5 percent to overall gross domestic product growth. In this scenario, 2.2 million IT jobs can be created, compared with the 280,000 that are in the country today.

India's higher education industry must move from a completely state-funded model to a synergistic private-public partnership model, wherein the dynamics of economic decisions are dictated by the market, rather than through political populism. New educational institutions need to combine the academic credibility and infrastructural comforts of government sponsorship with the efficiencies and state-of-the-art technologies of a market-oriented system.

Third, India needs to make dramatic improvements in its overall infrastructure—especially power, roads and public transportation. The power sector alone is characterized by blatant theft, high costs and huge transmission and distribution losses that annually waste millions of dollars across the country.

Fourth, India urgently needs to produce its own multinational corporations and some noteworthy global products. Even today, the migration up the value chain has barely begun for various IT companies in India; most still earn their revenues through different forms of "body shopping," rather than through premium services.

Fifth, since government occupies a huge economic space in India, there must be concrete efforts to create a regulatory and policy environment that stimulates growth and works with market forces rather than against them. Government must do what it alone can do best—create growth-enhancing regulatory frameworks, make transparent rules for international exchange of manpower and resources, create a system of clear property rights, forge innovative private-public partnerships in infrastructure development and management, and establish an enforceable legal environment.

Sixth, as a major user of IT in India, government needs to invest heavily to IT-enable its activities. Government is sitting on a huge untapped demand for government-to-citizen, government-to-business and government-to-government services. Several studies have demonstrated that it is usually G2C services that drive various B2B and B2C services. Thus, a cleverly designed public-private partnership will help deliver citizens' services in a commercially viable, competitive manner and make it profitable for private companies, as well.

What e-government initiatives will do, quite apart from opening a huge market for IT products and services, is spread IT culture among the common people. By building a huge constituency of support among citizens for electronic services, the power of organized vested interests and unions—which have blocked such progressive reforms in several government sectors for a long time—will be undermined. As a consequence, future IT-enabled reforms will be easier to implement inside India's vast public sector.

Finally, several progressive economists argue that the success of the U.S. economy is largely because of links among government, private industry and the Department of Defense that pump billions of dollars into high-tech R&D. India's government needs to forge similar relationships with the high-tech industry and research labs. In India, academia, research think tanks and industry are relatively insular from each other. We need to develop relationships for a greater cross-fertilization of ideas and resources.

The ongoing IT revolution is a timely reminder that India needs to harness its huge talent to move from a slave labor kind of knowledge economy—which is still nascent—to a full-fledged knowledge society in all respects. What needs to be recognized by both industry and government is that this is just the beginning of a beginning, and much more remains to be done.

If India doesn't seize the opportunity that's well within its reach now, posterity will judge it harshly. CIO

Srivatsa Krishna is a columnist and a member of the Indian Administrative Service in Hyderabad. These are his personal views. He can be reached at *skrishna@ap.gov.in*.

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Power in Numbers

BY CATHY HOTKA

ILLUSTRATION BY GREGORY CHRISTIE

YOU'RE AN I.T. PROFESSIONAL, so you know all there is to know about wireless standards, customer care technologies, firewalls, broadband, Linux and outsourcing, right? What do you know about XML, PKI (public key infrastructure) and SSL (secure sockets layer)?

The explosion of technologies and the potential applications for them is a real challenge for IT professionals at retail companies. CIOs and other top-level IS staff are not only the chief technology people at prominent companies, they are also catalysts for business change at all levels. They use a number of methods to keep up with it all, including reading magazines like *CIO* and attending conferences. But when it comes to getting a reality check on how their peers are actually using technology, they also use opportunities offered by associations like mine. I'm vice president of information technology for the National Retail Federation (NRF), a trade association based in Washington, D.C. Associations like mine are a valuable way for IT executives to keep in touch with others in their industry.

It's my job to gather information about how retailers of all sizes are using various technologies, and I get them together to exchange ideas and experiences. My longtime associate Don Gilbert and I talk with retailers about technologies they're implementing and how well their tools and plans are working in their specific situations. We take that information and turn it into compelling peer get-togethers and best practices documents.

We meet twice a year around the country with hours devoted to roundtable discussions. Retail CIOs who invest time in NRF's committees know that there's no substitute for exchanging notes in person with peers from other retail companies. In a no-pressure setting, retailers take the time to talk about what they've installed, how they plan to beef up infrastructure, their ideas about employee retention and the future of the industry. Tech chiefs speak freely about how well computer telephony integration works in their call centers, and they talk about bugs in new database releases and new connectiv-

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ity tools and whether they live up to the hype. Angry about software licensing? There's nothing more empowering than discovering that others are too—and that they might have valuable insights to share.

These off-the-record roundtables are open only to retailers—no vendors allowed. The gloves come off, and members speak out on issues, trade benevolent insults, ask for ideas and assistance, and clarify which technologies they think don't have a chance. People who haven't been involved in meetings like this may think that they're fluffy because the subject matter is only minimally technical. But the challenges that retailers face in using multiple channels like catalog and Internet sales to reach new and existing customers are myriad, and there's nothing more valuable than talking to peers in the same industry who share similar experiences and similar thoughts.

Trade associations will go to bat for their members. We can talk to the press and explain that the stupid mistake you just made has been made by many others in other industries.

Our discussions occasionally sound like *The McLaughlin Group*. One meeting held while we worked for the petroleum industry lasted eight hours without a break—and members were loathe to hit the bathroom, fearing they'd miss a highlight during their short hiatus. When meetings are over, members are still in the room, asking each other questions and hearing each others' thoughts. After formal sessions conclude for the day, we retire to the restaurant and then to the bar, where some claim the real work gets done.

Industry associations that haven't instituted committees like these—and companies that haven't joined them—may mistakenly think that competitors, particularly opponents as fiercely competitive as retailers, will never exchange information about what they're doing. But technologies are only as good as their execution, and company-specific tidbits rarely benefit competitors. So people are more willing to share than you might think.

Another benefit that these meetings bring is joint industry action to address a common problem. Our year 2000 project was recognized by the White House as having provided outstanding leadership to private businesses. For three years, 150 retail industry IT professionals, lawyers and internal auditors explored how to escape anticipated system failures as a result of the date rollover. You already know the result—your neighborhood stores opened as planned on Jan. 1, ready to take your money.

There's similar work going on with retail technology standards. The Association for Retail Technology Standards, the technology standards arm of the National Retail Federation, is working to define XML tags for the retail industry's data model for transaction capture. No individual member could accomplish this alone.

Perhaps the most obvious work that trade associations do is head well-meaning but misguided legislation and regulation hatched in Washington (and that's why most trade associations are in the nation's capital). We're now working to address potential legislation addressing customer data privacy. It seems reasonable to ask online companies not to share information about their customers with third parties—until you consider that this might mean that a retailer would not then be able to ask UPS or FedEx to deliver products to its customers. Business practices that are necessary for good customer service can sound just plain wrong—until you know why they're in place. And our association's job is to help people in Washington understand those reasons.

In many cases, trade associations labor alone without direct input from key, dues-paying companies. However, the results of actively participating can be remarkable. Committee participants get insights that even pricey consultants can't match. And there's nothing like peer feedback. At one meeting, a CIO mentioned that he was piloting an expensive new technology and watched as his colleagues dropped their jaws and mouthed "Huh?" That reaction was worth a lot of consulting fees, and the project was dropped before much more money had been spent.

Trade associations will go to bat for their members. We can talk to the press and explain that the stupid mistake you just made has been made by many others in other industries. We'll fight for your issues on Capitol Hill, even if you don't know you should care about them. We'll even help consumers understand that baffling new fee that's just shown up on their phone bill.

There are plenty of associations out there. Get involved with one. Try the association that represents your business, then get in touch with associations representing technology issues you care about. Chances are good that they'll have newsletters you'll want to read, webcasts you'll want to see and all-day meetings that end with a great dinner and cigars at the bar. We're working for you—use us! CIO

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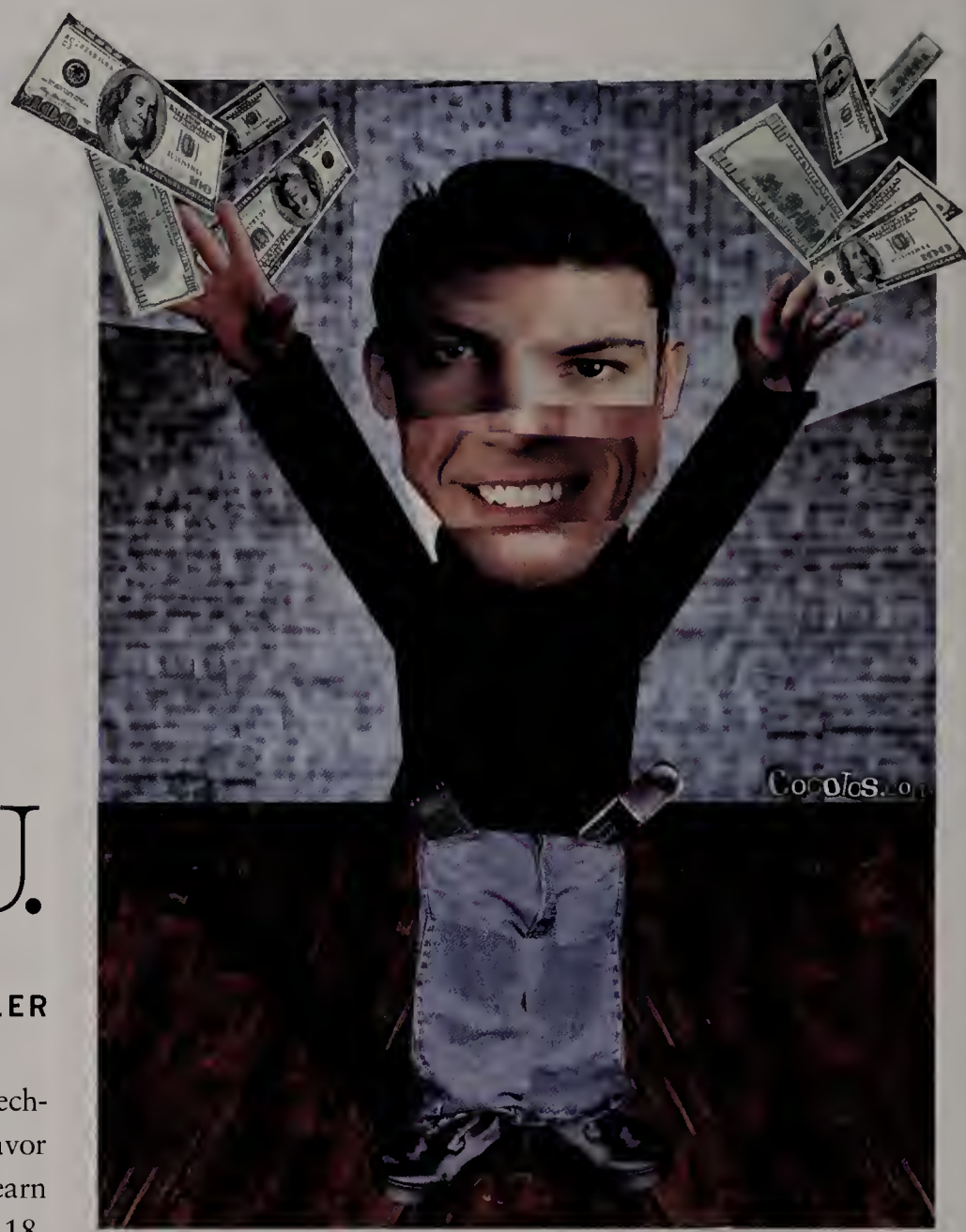

Cubicle U.

BY MARTHA HELLER

IN EARLY SEPTEMBER, *The New York Times* ran a story about technologically talented teens who pass up college degrees in favor of immediate income and on-the-job training. "Why go learn something I already know?" asked Thomas Gaietto, an 18-year-old network administrator, of reporter Matt Richtel. "Everyone I know who is getting a four-year degree is behind the times."

Does Gaietto have a point? Do information technology professionals need college degrees?

Recent reports put out by the U.S. Census Bureau and the Bureau of Labor Statistics show both a downturn over the past several years in the percentage of high school graduates receiving college degrees and a greater increase in employment in high-tech industries than in other fields. Clearly, some high-tech companies are filling their open positions with high school students.

Organizations like the Information Technology Association of America (ITAA) in Arlington, Va., are hoping that high school graduates will actually help solve the IT worker shortage crisis. Together with the Washington, D.C.-based National Alliance of Business and the Newton, Mass.-based Education Development Center, the ITAA is sponsoring a two-year national school-to-work program that seeks, in part, to help students with strong programming skills find work right after their high school graduation ceremony.

The average salary for all employees in the software industry, according to the Business Software Alliance in Washington, D.C., is more than $68,000 a year (that's more than double the average salaries in all other private industries). Four years of college tuition usually cost far more than that, so it's no wonder more and more students are going straight from the high school cafeteria to the corporate cubicle.

With the potential for technology to change drastically over four years, some students worry that their skills will be obsolete by the time they graduate. On-the-job training, they believe, will serve them better both now and in the long run. So

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do IT professionals really need college degrees?

Senior Web Editor Martha Heller can be reached at *mheller@cio.com.*

A HIGH SCHOOL DIPLOMA IS PROBABLY OK FOR CODING-type work, but when it comes to complicated coding projects, understanding the business end of the project becomes more and more important. A college degree in business or MIS would make more sense in the long run. I personally would be hard pressed to hire someone without a college background, unless that candidate was supported by lots and lots of experience. IT personnel need to be able to communicate both verbally and in writing. My company seeks people with MBAs for the kinds of strategic IT work we're doing, and a coder won't be able to fit well at the corporate levels of management where the IT environment is either made or broken.

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Do IT Staffers Need a Degree?

Want to sound off on this or other topics? Join the ongoing debates at *comment.cio.com.*

AS AN I.T. MANAGER, I WOULD NEVER HIRE SOMEONE without a minimal college education unless the position was entry level, nonprofessional. College is not there to teach students to be programmers, system administrators and so on. College is there to teach students to think, write and speak at a level that will aid them in beginning a career that should last a lifetime. High school grads who skip this advanced education are only hurting themselves in the long run. What are these whiz kids going to do when they aren't competitive for management positions because they only have technical skills? They can't remain Web developers or system administrators for 30 years.

Amy Jessup
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I FEEL VERY STRONGLY ABOUT THIS SUBJECT. NOT HAVING a completed undergraduate degree has held me back from moving from the public sector, which does not have the same prejudices about degrees, to the private sector, where my experience and skills could command a much higher salary. I am happy to see a trend toward hiring for results rather than what is on a piece of paper. Having been in the IT field as a programmer, analyst and project manager for more than 25 years, I can tell you from experience that a degree doesn't count for anything if the individual can't do the work. I hire for experience and the individual's ability to think and reason, not for a piece of paper that says she sat in classes for four years. How do I know she learned anything?

C. Hale
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MORE AND MORE COMPANIES ARE ACCEPTING EXPERIENCE or a combination of education and experience. Classroom education will probably never keep up with good ol' hands-on experience. I'll take a candidate with experience any day over one with a college education.

Brad Cantwell
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I.T. PROFESSIONALS IN TODAY'S HYPERCOMPETITIVE market need education but not necessarily degrees. More and more the two are not always synonymous: College education provides a broadly generalized knowledge of computing concepts and precepts but not the focused skills that today's employers demand.

In fact, two of my most valuable IS managers do not have bachelor's degrees. And they run circles around many more well-heeled, traditionally educated peers. In all honesty, I lack a bachelor's degree as well, and while it may be an obstacle to getting one's foot in the door, once the door is open, it is an individual's performance and professionalism that are key.

Knowledge is acquired in many different ways, and each human being learns in a unique manner. Who is to judge that one man's college education does or does not equal or surpass another's autodidactic experience? It is, in my mind, simply one of many criteria by which a candidate is evaluated—an increasingly minor one.

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gbeach@cio.com

Technology's Promise

Gary J. Beach

TECHNOLOGY THIS. Technology that. Every cure for every ill seems to have a technology component. Some good. Some not so good.

Like those smiling/frowning masks you can buy along Bourbon Street in New Orleans, several days last month showed me two very different faces of technology innovation.

The first episode started innocently enough. My wife and I took her parents to lunch to celebrate their 50th wedding anniversary. After the meal, my father-in-law grabbed me by the arm and said, "Come on outside. I want to show you something."

As we exited the restaurant he proudly pointed to his brand-new car. He opened the door, told me to sit in the driver's seat and excitedly said, "I want to show you some really neat technology." Hmm, I wondered to myself, what's next?

"Put your foot on the brake," he instructed me as he reached to activate a button on the driver's seat side. Immediately the brake and gas pedal moved forward then backward in unison. "This is an incredible innovation," he proclaimed. "Just think, now your mother-in-law will not have to adjust the seat before she drives the car."

I nodded politely as I thought to myself, Wow, the workers in Detroit have really outdone themselves with this totally underwhelming feature.

The next day, however, my faith in technology's promise was renewed.

With 434 other teens, my daughter had attended the National Youth Summit in Washington, D.C. The summit is sponsored by Mothers Against Drunk Driving (*www.madd.org*) and is held every four years. The goal of this year's summit was to have the teenage delegates (one from each of the 435 congressional districts in the United States) propose solutions on how to prevent underage drinking to congressional lawmakers.

One of their proposals, which was presented to the media at a Boston news conference the day after my in-law luncheon, relied on the power of technology and made a lot of sense to me.

The kids came up with this idea: Challenge the automobile industry to make alcohol-sensing ignition systems mandatory, just like seatbelts and airbags, on all cars, SUVs and trucks. No date was set for compliance.

Brilliant, I thought.

How should technology innovation be deployed by the automobile industry? Should it keep on its current path to turn our cars and SUVs into mobile offices traveling 60 miles per hour? Or should it listen to the National Youth Summit recommendation and collectively work together to use technology to make it more difficult for drunk drivers to operate a vehicle?

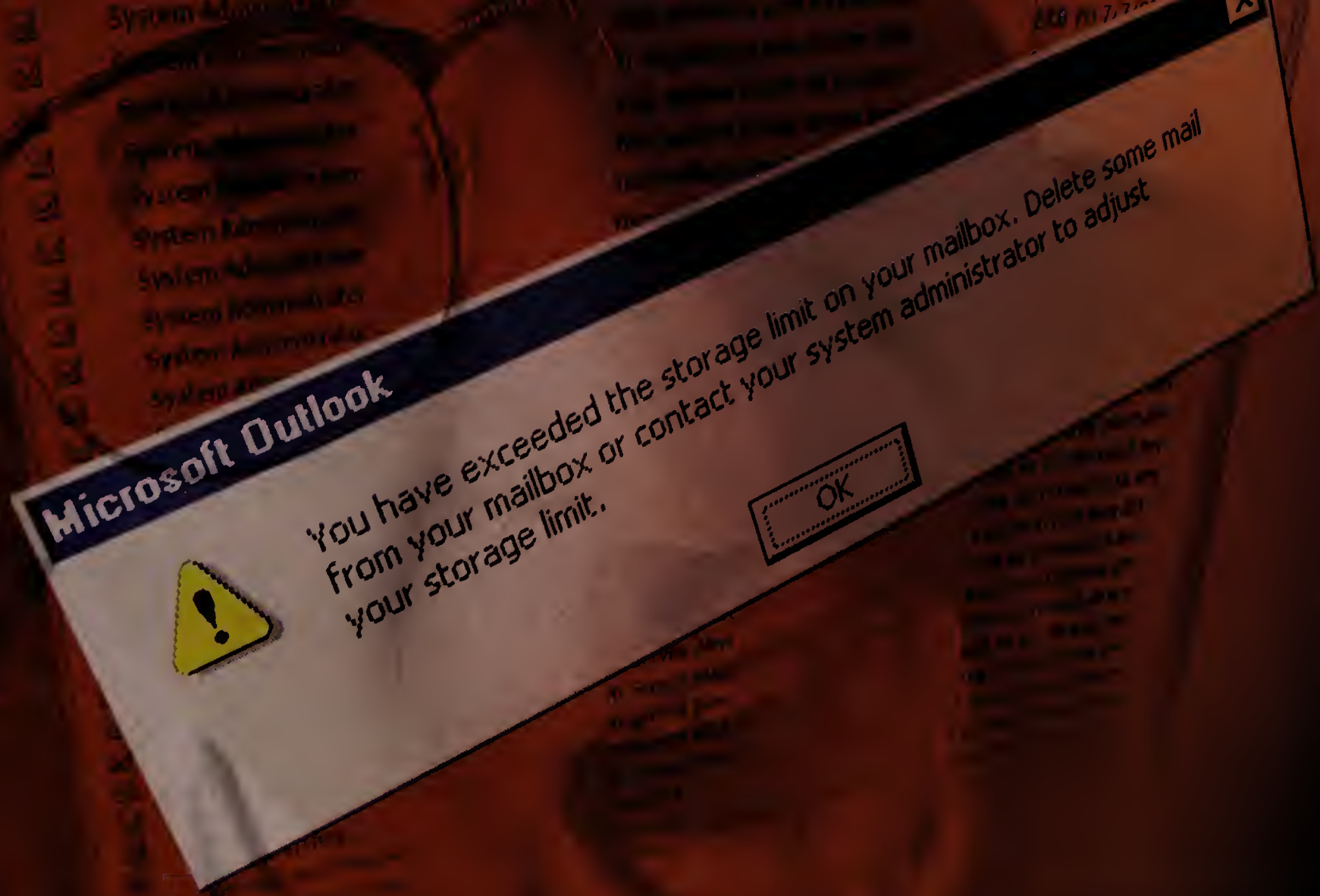
I think the answer is clear.

As chief information officers, you know how technology used well can lower costs. The time is now for the automobile industry to leverage technology to reduce the appalling number of individuals killed each year in crashes caused by drivers operating under the influence of alcohol.

Drop me an e-mail, and I will make sure your voice is heard in Detroit and by lawmakers in Washington, D.C.

PHOTO BY WEBB CHAPPELL

Email Should Not Be E-Hell.



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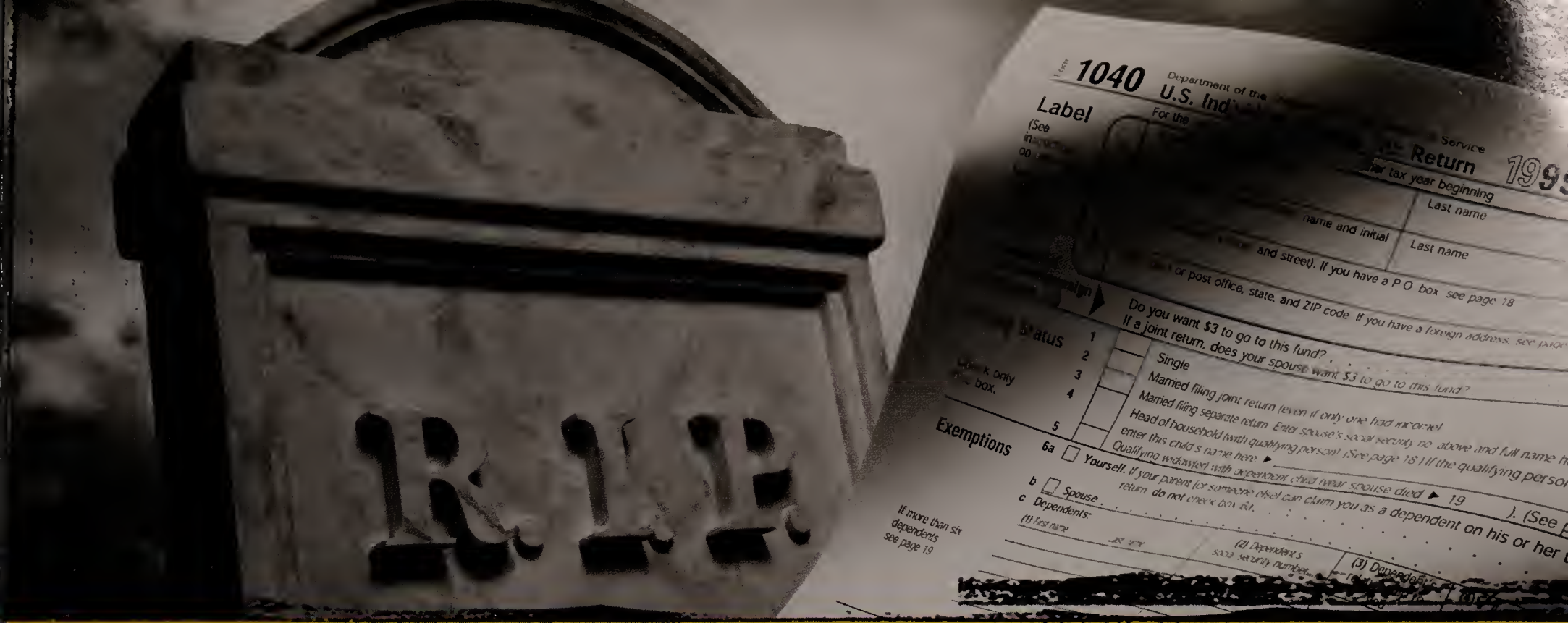

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Senior Editor, *CIO India*
Bangalore, India

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Reporter's Notebook

In the end, they almost don't let me out. It's 2 a.m. on a Saturday, and I'm dog-tired after a hellacious week of reporting and writing. Yet I'm enjoying a burst of energy because here I am at the Bangalore airport international departure gate. After a month in India—a month in which I've endured monsoon rains, deadly riots, gut-wrenching sickness and all the fundamental elements of culture shock—I'm finally going home.

At least, that's what I think until I reach the customs desk. Nothing seems amiss—my luggage has been examined and tagged, and I have exchanged my last Indian rupees for U.S. dollars. When I fill out my departure slip and hand it over along with my passport, the Indian customs official studies the two documents and frowns. "The signature isn't the same," he says. What? "The signature on your passport and the departure slip—they don't match," he says.

Good Lord, now what do I do? I take out my wallet and produce extra identification—my driver's license, Social Security card, credit cards, even my Blockbuster rental card. The customs agent holds up my license and passport. "See?" he says. "These two signatures are the same, but your new one doesn't match."

Cut me a break, I think. I'm facing a 27-hour trip to the United States. Can't there be a little leeway for my signature to look a little lazier than usual?

"Sign this," the customs agent says, handing me a slip of paper. I sign it, and he just shakes his head. I sign it again—no reaction. I sign it a third time, and something clicks. He stamps my passport, hands me back my departure slip and waves me through. I grab my bags, step into the departure lounge, and moments later I'm on an Air-India jet, waving a heartfelt goodbye to India.

I tell this story to illustrate a point. Nothing is easy in India: not getting into the country, not getting around, not doing business, not even getting out. Yet, neither is anything impossible. In less than a decade, India has established itself as a major player in the global IT market. Indians have attained world-class heights in providing IT services and software, and (most remarkable of all) they've almost made it look easy.

I realize as I fly away that even if I don't return to India anytime soon, I'll be watching this country's progress for many years to come. We all will.

–Tom Field

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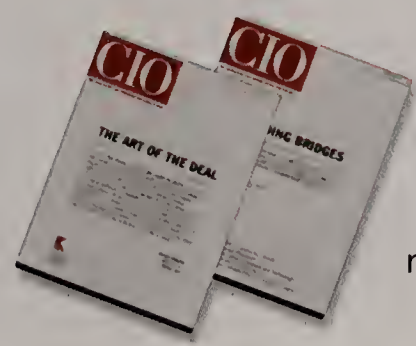

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In Future Issues

Filthy Files

Is your customer data dirty? In companies with large customer and vendor databases, redundancies and incorrect information in the data warehouses can really throw a wrench in the gears of commerce. The ramifications of dirty data may surprise you. Direct and indirect costs from dirty data can really add up, and cleaning up the problem can be a costly venture too. Read more about this filthy problem and the "data cleansing" industry that has appeared to clean up the mess.

Oversatisfaction?

Just how important is ensuring that your internal IT users are satisfied with the service that they are receiving? A few years ago, a number of companies made it a priority, but has it taken its toll? We'll take another look at this customer service issue through the experiences of some companies who have gone to great lengths to set up customer satisfaction surveys to benchmark their progress. Was all that time, energy and investment worth it?

Monkey in the Middle

Can an independent, third-party player that claims to be neutral really make a difference when it comes to streamlining supply-chain management? Envera thinks so. Could an e-business facilitator like Envera work for your company? Look for this article to find out.

Doctor.com

One of the biggest obstacles to putting medical records online is the fear that patient confidentiality might be breached. There is the danger of hackers breaching firewalls to obtain confidential medical data or that personal medical information gathered online might be sold to third parties. This story will examine how such concerns may be holding back online medicine and impacting the financial success of ASPs and how some CIOs in the health-care industry are forging ahead anyway.

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Power outages interrupt operations at 72% of U.S. businesses.

SOURCE: IDC

Power disturbances account for about one third of all server failures.

SOURCE: www.ContingencyPlanning.com and Ernst & Young, 1997

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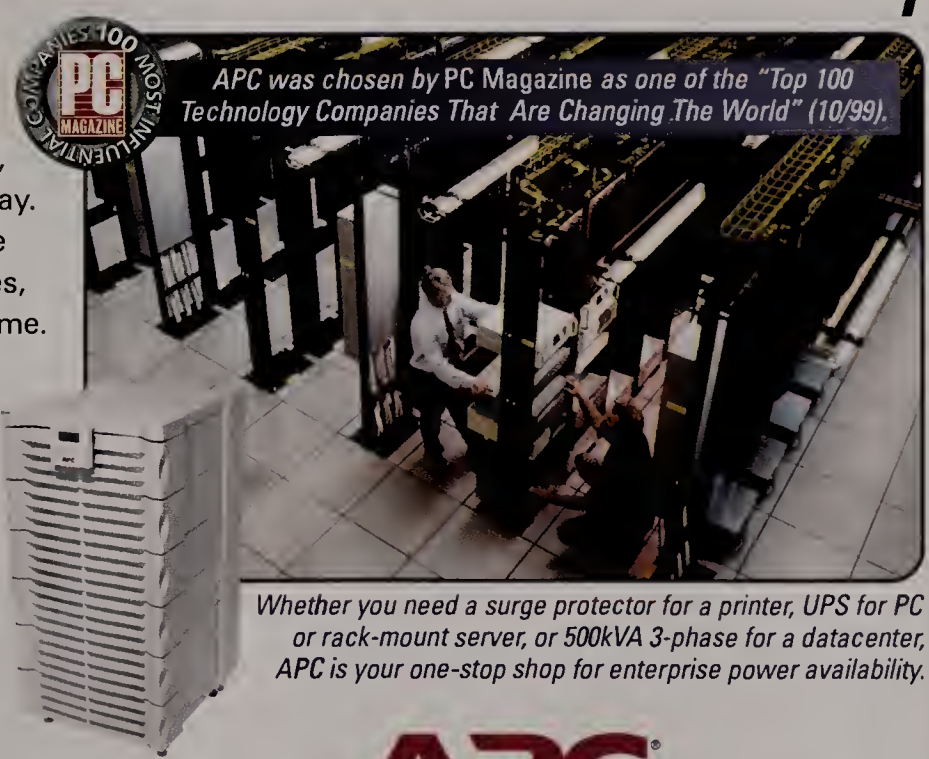

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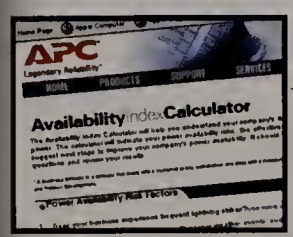

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Interview

BY DANIELLE DUNNE

Pamela PATTON CONE

Pamela Patton Cone, senior manager of Web development at Time Warner in New York City, was instrumental in creating two company intranets, one specifically for corporate headquarters and one serving all Time Warner companies. To hear more about the projects, log on to CIO Radio at www.cio.com/radio.

CIO: Tell me how you first introduced the intranet to Time Warner corporate.

Cone: When the development team prepared to launch the intranet for the corporate headquarters, we did a stress test on it to make sure the server would hold when lots of people hit it at once. At exactly 11 a.m. we had everyone from IS log on to the site. It should have taken about 15 minutes, but the test lasted about 25 seconds. The server collapsed. We were using middleware that had been misrepresented and really couldn't take simultaneous hits. We had planned a pizza party afterwards...the pizza hadn't even arrived by the time everyone was ready for it. We were disappointed of course, but it really was a blessing in disguise. Everyone who participated got on our side; they wanted to help. And we did replace the middleware and retest it successfully.

With performance issues under control, was it still difficult to persuade non-IT people that using an intranet was important?

It was difficult at first. We launched a pretty powerful but inexpensive marketing campaign to get everybody involved. I knew that unless we went to their desks and sat with them one-on-one they weren't going to make the leap, so that was one of our initiatives.

Was sitting down and talking to people enough to overcome resistance?

That was definitely a big help, but it took more—it took a lot of enthusiasm on our part. We did some "party crashing"—we would invite ourselves to meetings where we'd show off proof-of-concept sites and talk about the opportunities on the Web. For example, I attended a meeting of the Minority Business Development Program sponsored by Time Warner. I demonstrated TWIX [Time Warner Information Exchange, the enterprisewide intranet], which wasn't yet launched, and showed how it could be the platform to connect their minority and women-owned business directory, enabling all Time Warner companies to share this vendor info online.

Did the traditional corporate environment change as a result of this project?

Definitely. People now share information much more quickly and get things accomplished faster. The intranet also brought the company together in wonderful ways, even by posting pictures of the holiday party on the site. It makes us feel like more of a team. CIO

Web Writer Danielle Dunne helps populate *CIO*, its intranet and its website, CIO.com. E-mail her at *ddunne@cio.com*.

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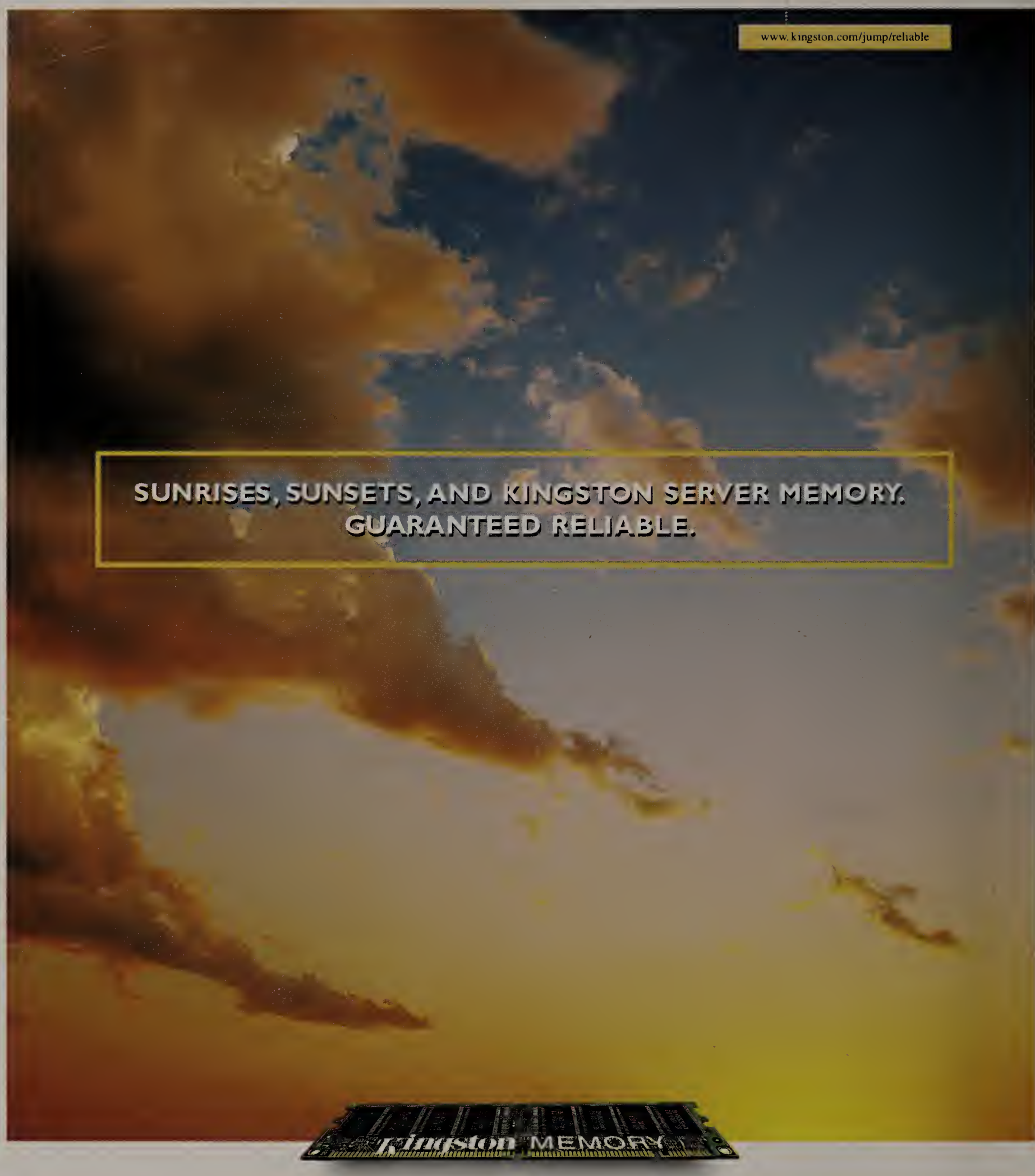

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